GEOTECHNICAL INVESTIGATIONS REPORT
OF THE
PIPING FAILURE OF ANITA DAM

Second Phase of Additional Investigations
(Drilling, Standard Penetration Tests, and Additional Laboratory Testing)

Report by Lovell Parish

Purpose of this Report

This report documents the final portion of investigations recommended by the Board of Inquiry convened to determine the cause of the piping failure at Anita Dam. Two previous reports by this author have presented the results of other portions of the extended investigative program.

Drilling, sampling, and in situ testing for this phase of subsurface explorations were completed during May of 1997, utilizing personnel and equipment of the Bureau of Reclamation and the Bureau of Land Management. Laboratory testing was performed by two commercial laboratories in Billings, Montana.

Investigations consisted of drilling a total of 5 holes in the embankment and foundation of the dam to determine characteristics of both the embankment and foundation materials. Four of the holes were drilled along the dam axis and the other was completed near the vertical risers for the valve control structure and the overflow spillway. Standard Penetration Tests (SPT) were conducted in the embankment and foundation to detect soft zones and provide representative material for moisture determinations, gradations and Atterberg Limits. Two undisturbed samples were collected for one-dimensional consolidation testing near the base of the vertical risers, and an additional sample of embankment was tested for the presence of dispersive clays. Double porous tube piezometer installations were completed in two of the drill holes.

Appendices attached to this report contain both raw data and interpretative information derived from that data. Appendix A includes an investigations locations map provided by BLM and a geologic section along the axis of the dam constructed from data obtained by recent drilling. Appendix B contains the individual geologic logs for the five new drill holes. Appendix C includes separate data sheets for each SPT test that was performed and a summary table of test results. Appendix D includes laboratory test data on moisture contents, gradations, and Atterberg Limits. Also included in Appendix D are the results of one-dimensional consolidation tests and an additional test for the presence of dispersive clays.

A supplemental Bibliography is included at the end of the text.

Findings

The most recent investigations at Anita Dam confirmed some findings from previous explorations and provided new information about other aspects of the damsite and existing structure.

Drawing 9008-600-140 is a geologic section along the axis of the dam from left to right looking downstream. It presents a somewhat generalized interpretation of materials encountered in both the dam and the underlying foundation. Most of the structure is founded on glacial till classified as Lean Clay With Sand And Cobbles (CL), with a lake or pond sediment classifying as Sandy Lean Clay (CL) being under the left abutment. The Bearpaw Shale bedrock that was reported by BLM personnel as being present in the cutoff trench was not encountered by any of the recent drill holes even though they penetrated to a maximum depth of 100 feet.

The glacial till varied from brown to gray in color and consisted of mostly low plasticity fines with a minor amount of fine to coarse sand and a trace of predominantly fine gravel and cobbles. Rare small boulders were also present in the deposit. A gradation average for five samples was 72.8% fines, 26.7% sand, and 0.5% gravel. The average liquid limit (LL) was 40% and the average plasticity index (PI) was 28%. Moisture content average for all till samples was 17.1%.

Lacustrine material was only identified in PR97-205. It was brown in color and composed of mostly low plasticity fines and predominantly fine to medium sand. The gradation for the single sample tested was 75.8% fines, and 24.2% mostly fine sand. No gravel was present. The LL was 42% and the PI was 29%. Average moisture content for all lacustrine samples was 13.7%.

Embankment material varied in color from brown to gray and consisted of mostly low plasticity fines with fine to coarse sand and a trace of mostly fine gravel. The average gradation for four samples was 79.1% fines, 20.5% sand, and 0.4% gravel. The average LL was 43% and the average PI was 30%. The moisture content averaged 14.5%.

A total of 122 SPT tests were completed during the recent investigations. They were conducted at approximate 5 foot intervals through the embankment and at approximate 2.5 foot intervals in foundation materials. The primary purpose of these tests was to detect soft zones. In order to expedite the drilling program they were completed through the hollow stem auger system without having the hole filled with drilling fluid, so the results should not be used for liquefaction potential studies. Individual SPT data sheets are included in Appendix C along with summary tables for each drill hole that show blow counts and moisture contents of the sampled material.

The average blow count per foot of penetration in the embankment was 16 while the blow count for the glacial till averaged 14 and the lacustrine 24 blows. For individual holes the average blow counts were:

PR97-201	PR97-202	PR97-203	PR97-204
embankment = 17	embankment = 15	embankment = 15	embankment = 16
glacial till = 7	glacial till = 22	glacial till = 12	glacial till = 15

PR97-205
embankment = 21
lacustrine = 24
glacial till = 20

A table of relative firmness in the Bureau of Reclamation's "Earth Manual" shows the following blow count classifications. It should be noted, however, that this table is based on "saturated" fine grained soils and the soils in these tests were mostly from "unsaturated" units so the results may be misleading if the units become saturated at a future date.

Blows per Foot	Consistency
below 2	very soft
2 to 4	soft
4 to 8	medium
8 to 15	firm
15 to 30	very firm
above 30	hard

Using this table as a guide, the SPT blow counts recently obtained generally varied from "very soft" to "firm" with some counts falling in the "very firm" and "hard" categories. The softest materials were encountered in the glacial till of the foundation in drill holes PR97-201 and -203. In some instances, the SPT barrel and drill rods settled through the test interval without being struck by the 140 pound drive hammer, thus indicating some extremely soft material. With only one exception (6 blows from 37.5 to 38.5 in PR97-204), the blow counts in the embankment indicated satisfactory compaction. The lacustrine material in the left abutment foundation sampled in PR97-205 had the best blow count average of 24.

Two undisturbed acrylic tube samples were collected from embankment materials near the base of the vertical risers for the valve control structure and the overflow spillway. The results of one-dimensional consolidation tests conducted on these samples are included in Appendix D. The sample from 32.4 to 33.5 feet in PR97-201 revealed a percent swell of 2.3 for a CL material having a dry density of 109.2 pcf and a natural moisture content of 18.4%. The sample from 37.0 to 38.8 feet in PR97-201 had a percent swell of 2.3 for a CL material having a dry density of 105.8 pcf and a natural moisture of 20.9%. According to the geologic log for the drill hole, these tests were conducted on embankment material lying just above the embankment/foundation contact. SPT blow counts in the area of the tests were in the 15 to 17 range.

One additional sample of embankment material was tested for the presence of dispersive clays. It was obtained from a depth of 19.5 to 24.5 feet in PR97-202. Like other samples previously tested, the results were positive.

Double porous tube piezometer installations were completed in drill holes PR97-202 and -205 to monitor groundwater levels. Piezometers were not installed in the other holes because of the likelihood they would be destroyed by future reconstruction activities. At the time the recent investigations were completed none of the piezometers indicated a groundwater level. The material encountered by drilling was very tight and if a groundwater level does exist at the elevation of the piezometers, it may take some time to permeate into the drill hole.

Conclusions

The investigations completed under this phase did not shed any further light on the exact

methodology of failure. What caused the original path of seepage will probably never be known.

Bearpaw Shale bedrock which had been reported to be present in the cutoff trench beneath the dam was not encountered even though drill holes were completed to a maximum depth of 100 feet (as measured from the ground surface on the dam).

SPT results indicate the presence of very soft material concentrated in the foundation of the dam in the vicinity of drill holes PR97-201 and -203. This is in the thalweg of the valley floor and probably is the result of a saturated condition in the glacial till that has not yet revealed itself in the recently installed piezometers.

The SPT blow counts further showed that the compaction of the embankment was satisfactory with only one anomalous count indicating otherwise, and that the highest blow counts were recorded in the lacustrine material beneath the left abutment - which was somewhat surprising because in surrounding glaciated areas lacustrine sediments are usually some of the softer materials.

Gradations, moisture determinations, Atterberg Limits data, and dry densities from the latest investigations generally confirmed results obtained earlier.

An additional test for dispersive clays in the embankment also confirmed earlier positive results.

Recommendations

As recommended in a previous report, excavation of the outlet pipe should be observed by personnel familiar with the dam, how it was constructed, and the various modes of failure that have been proposed. Hopefully, some further evidence of the mechanism of the piping may be uncovered.

If the dam is reconstructed, the latest design criteria and construction procedures should be followed for structures containing dispersive clays and include those specific precautionary items identified in the previous investigations report.

A geotechnical engineer familiar with construction of earthen embankments on soft foundation materials should carefully review the SPT data to determine if the bearing capacity of the glacial till is sufficient to support the outlet structure without causing undue problems.

Above all, a thorough peer review should be made of the final design and all proposed construction procedures with special emphasis on dispersive clay and soft foundation problems.

SUPPLEMENTAL BIBLIOGRAPHY

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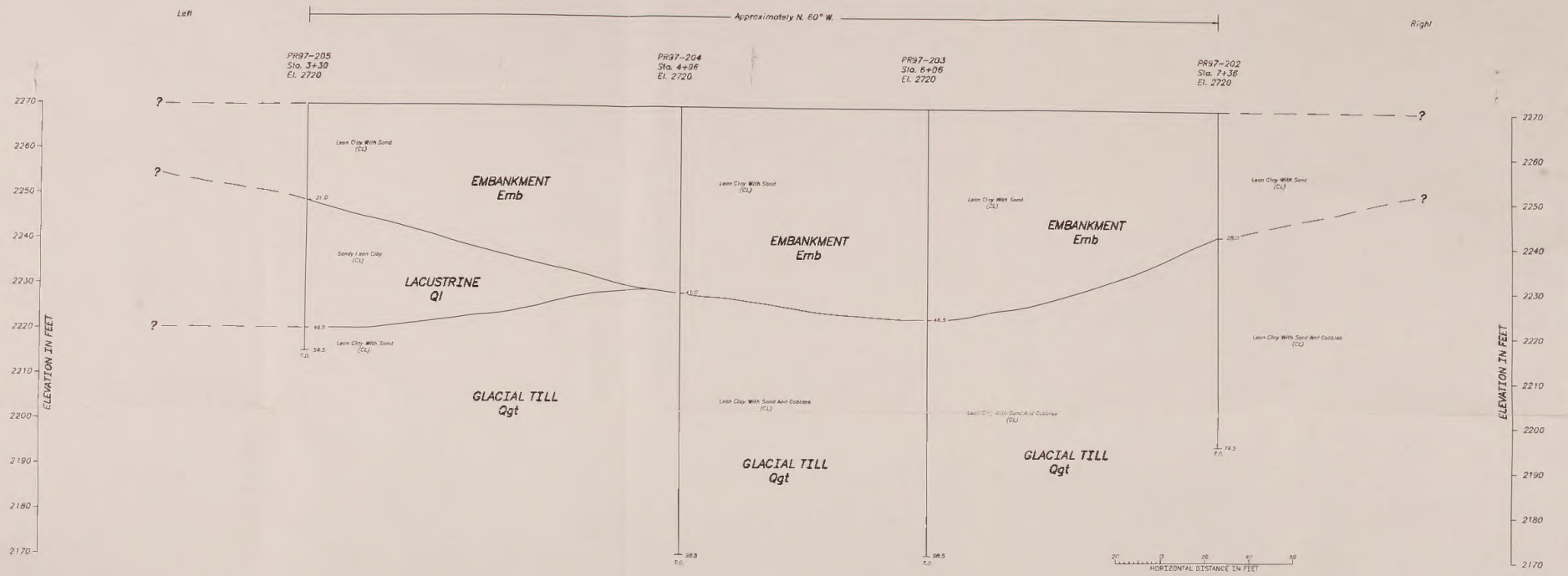
APPENDIX A
DRAWINGS



SYMBOLS

PR97-202 ← Drill Hole Number
Sta. 7+36 ← Dam Axis Station
El. 2720 ← Top of Drill Hole Elevation

(CL) ← Unified Soil Classification Symbol

28.0 ← Depth

74.5
T.D. ← Total Depth

EXPLANATION

EMBANKMENT – Emb: Impervious fill consisting of compacted glacial till and some lacustrine material. It generally is Lean Clay With Sand classifying as CL.

LACUSTRINE – Ql: Lake or pond sediment consisting of mostly low plasticity fines and fine sand. It is generally brown in color and is described as Sandy Lean Clay classifying as CL.

GLACIAL TILL – Qgt: Glacial deposit consisting of mostly low plasticity fines and fine to coarse sand with a trace of gravel and cobbles. Rare small boulders are present. It varies in color from brown to dark gray.

NOTES

1. Locations of drill holes are shown on the Investigations Location Map.
2. Standard Penetration Test (SPT) data is presented on tables and geologic logs.
3. No groundwater was noted during drilling.
4. Section viewed looking downstream.

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
ANITA DAM
BLAINE COUNTY, MONTANA

BLM STRUCTURE
FIRING FAILURE INVESTIGATION
GEOLOGIC SECTION ALONG AXIS

DESIGNED: L. PARTISH — TECH. APPROVAL
DRAWN: CADD SERVICES — SUBMITTED
CHECKED: L. PARTISH — APPROVED

CADD SYSTEM: CADTOS
FILLMORE, MONTANA
CADD FILENAME: FILNAME
SHEET NO.
DWG. DATE
DATE AND TIME PLOTTED: PLOTDATE

9008-600-140

LEGEND

300	soil tests taken April 1997
201–205	borehole testing by BOR in May of 1997
A–E	soil tests taken in January of 1995
20–32	soil tests taken in June & July of 1995
1–8	soil tests taken in October of 1993
101–105	soil tests taken April of 1997

SEE ATTACHED LIST FOR ELEVATIONS

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DRAWING NO. _____

TITLE ANITA SOILS TESTING
DATE 5-28-97
SHEET 1 of 1
DRAWN HAC-LRB/BO

DESIGNED _____ REVIEWED _____ APPROVED _____

BOREHLS2.DWG 5-28-97

APPENDIX B
GEOLOGIC LOGS

GEOLOGIC LOG OF DRILL HOLE NO. PR97-201

FEATURE: Anita Dam
LOCATION: Center Section; U/S Face
BEGUN: 5/1/97 FINISHED: 5/4/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 100.0
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2711.9
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES

NOTE:
All measurements are from ground surface.

All measurements are in feet unless noted otherwise.

PURPOSE OF HOLE:
To determine physical properties of embankment and foundation materials.

DRILL RIG:
Truck-mounted CME-85 rotary drill rig.

DRILLER:
Mike McNamee; USBR

DRILLING METHOD:
0-3.5' advanced drill hole with 4-1/4" I.D. hollow stem auger (HSA) system and 5-foot-long inner barrel. 3.5-99.0' conducted SPT (a standard penetration test); and cleaned out and advanced drill hole between SPT intervals with 4-1/4" I.D. HSA system and 5-foot-long inner barrel. 99.0-100.0' advanced drill hole with 4-1/4" I.D. HSA system and 5-foot-long inner barrel.

DRILLING CONDITIONS:
Void encountered from about 20.5-29'.

PROGRESS RECORD:

Date (1997)	Interval Drilled (ft)
5/1	0-43.5
5/2	43.5-70.0
5/3	70.0-92.5
5/4	92.5-100.0

CASING RECORD:
No casing used.

DRILLING FLUID:
No drill fluid used.

HOLE COMPLETION:
(5/4/97) Backfilled with cement grout from bottom of hole (100.0') up to 25' (void from about 20.5-29'). Bridged hole with a "rock" at a depth of 8' and backfilled with drill cuttings from 8' up to ground surface.

DEPTH	% CORE RECOVERY	GEOL. UNIT SYMBOL	PLT. CLASS/LITH	ELEVATION	SPT	RQD	% MOIST CONTENT
	97						
	100						
	93				*17		17.0
	100						15.4
	100						
10	73				*18		15.3
	100						
	100						
	57				*18		15.4
	100						17.8
20	100	Emb	CL				
	0						
30	67						
	100						
	87				*15		16.3
	72			2672.4			
40	100				*17		18.5
	100				*17		18.8
	100				*20		18.7
	100						
	100						
	47				*17		18.1
50	100				*18		18.4
	100						
	40				*13		17.8
	100						
	0			0			
	100						
	0			2			
60	100						
	100						
	96			5			16.1
							16.8
	100						
70		Qgt	CL				
	91						16.4
							17.3
	91						
80	0			0			17.4
	100						
	0			2			17.2
	100						
	0			5			17.1
	100						
	0			0			17.0
90	100						
	0			0			18.4
	100						
	0			3			16.5
	100						
	0			4			16.4
	100						
	0			0			16.9
	100			2611.9			

CLASSIFICATION AND PHYSICAL CONDITION

0.0-39.5' EMBANKMENT MATERIAL (Emb):

0.0-39.5' LEAN CLAY WITH SAND (CL). About 75-80% fines with medium plasticity, medium dry strength, medium toughness; about 20-25% fine to medium sand; trace of coarse to mostly fine, hard, subrounded to rounded gravel; maximum size recovered, 1"; gray; moist; firm; some gravel consist of coal fragments; void encountered from about 20.5-29'; no reaction with HCl.

39.5-100.0' QUATERNARY GLACIAL TILL (Qgt):

39.5-100.0' LEAN CLAY WITH SAND AND COBBLES (CL). About 70-75% fines with medium plasticity, medium dry strength, medium toughness; about 25% fine to medium sand, with a trace of coarse sand; trace to about 5% fine to coarse, hard, subrounded to rounded gravel; trace of cobbles; maximum size recovered, 3"+; gray; moist; firm; numerous gypsum crystals from 39.5-50'; interbeds of Poorly Graded Sand (SP) from 55-57'; no reaction with HCl.

Bottom of Hole - 100.0'

COMMENTS:

Moisture samples were collected from HSA samples in SPT intervals of no recovery.

GEOLOGIC LOG OF DRILL HOLE NO. PR97-201

FEATURE: Anita Dam
LOCATION: Center Section; U/S Face
BEGUN: 5/1/97 FINISHED: 5/4/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 100.0
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2711.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES	DEPTH	% CORE RECOVERY	GEOL. UNIT SYMBOL	U.S.C. CLASS/LITH	ELEVATION	SPT	% MOIST CONTENT	CLASSIFICATION AND PHYSICAL CONDITION
LOCATION: Dam station 5+45; offset 34' upstream of centerline of dam.				BOTTOM OF HOLE				
	110							

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. PR97-202

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/4/97 FINISHED: 5/6/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 74.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES

NOTE:
All measurements are from ground surface.

All measurements are in feet unless noted otherwise.

PURPOSE OF HOLE:
To determine physical properties of embankment and foundation materials. To install porous tube piezometers in the foundation and embankment.

DRILL RIG:
Truck-mounted CME-85 rotary drill rig.

DRILLER:
Mike McNemes; USBR

DRILLING METHOD:
0-4.5' advanced drill hole with 4-1/4" I.D. hollow stem auger (HSA) system and 5-foot-long inner barrel. 4.5-71.0' conducted SPT's (standard penetration tests); and cleaned out and advanced drill hole between SPT intervals with 4-1/4" I.D. HSA system and 5-foot-long inner barrel. 71.0-74.5' advanced drill hole with 4-1/4" I.D. HSA system and 5-foot-long inner barrel.

PROGRESS RECORD:

Date (1997)	Interval Drilled (ft)
5/4	0-31.0
5/5	31.0-68.5
5/6	68.5-74.5

CASING RECORD:
No casing used.

DRILLING FLUID:
No drill fluid used.

HOLE COMPLETION:
(5/6/97) Backfilled drill hole with "Holeplug" (coarse grade bentonite) from bottom of hole (74.5') up to 35.0'. Placed graded sand from 35.0' up to 33.0'. Installed a 2' porous tube piezometer (tip set at 33.0') with 3/4" I.D. PVC standpipe. Surrounded piezometer and standpipe with graded sand from 33.0' up to 30.0'. Backfilled drill hole with

DEPTH	% CORE RECOVERY	GEOL. UNIT SYMBL	FLD CLASS/LITH	ELEVATION	SPT	% MOIST CONTENT	CLASSIFICATION AND PHYSICAL CONDITION
	53						**0.0-28.0' EMBANKMENT MATERIAL (Emb):**
	80				•12	16.4	0.0-28.0' LEAN CLAY WITH SAND (CL). About 75% fines with medium plasticity, medium dry strength, medium toughness; about 25% fine to medium sand; trace of fine to coarse, hard, subrounded to rounded gravel; maximum size recovered, 1"; gray; moist; fine; some gravel consist of coal fragments; no reaction with HCl.
	100						
10	100				•15	15.5	
	100						
	7	Emb	CL				
					•22	13.5	**28.0-74.5' QUATERNARY GLACIAL TILL (Qgt):**
	100						
20	87				•12	14.2	28.0-74.5' LEAN CLAY WITH SAND AND COBBLES (CL). About 70-75% fines with medium plasticity, medium dry strength, medium toughness; about 25% fine to coarse sand; trace to about 5% fine to coarse, hard, subrounded to rounded gravel; trace of cobbles; maximum size recovered, 3"+; gray; moist; firm; interbeds of Poorly Graded Sand (SP) from 31-32'; numerous gypsum crystals from 53.5-54.5'; no reaction with HCl.
	100					14.9	
	87				•16	15.3	
	100			2692.0			
30	100				•22	11.7	
	100					14.6	
	80				•12	15.1	
	100						
	100				•21	18.3	Bottom of Hole - 74.5'
	100						
	100				•21	16.2	
40	100						
	100				•23	15.6	
	100						
	100				•24	15.4	
	100						
	100				•23	15.5	
	100						
	100				•19	15.5	
	100						
50	100				•23	14.8	
	100	Qgt	CL				
	100				•22	15.4	
	100						
	100				•24	17.5	
	100						
	100				•23	18.5	
	100						
60	100				•16	17.7	
	100						
	100				•34	17.1	
	100						
	50				•23	17.2	
	80				•22	14.7	
70	100						
	100				•21	16.1	
	100						
	100					16.2	
				2645.5			
			BOTTOM OF HOLE				
80							

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. PR97-202

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/4/97 FINISHED: 5/6/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 74.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES	
"Holeplug" from 30.0' up to 25.0' and placed graded sand from 25.0' up to 24.0'. Installed a 2" porous tube piezometer (tip set at 24.0') with 3/4" I.D. PVC standpipe. Surrounded piezometer and standpipe with graded sand from 24.0' up to 20.0'. Placed "Holeplug" from 20.0' up to 1.5'. Installed utility access cover set in cement grout from 1.5' up to ground surface. LOCATION: Dam station 7+36; centerline of dam.	

GEOLOGIC LOG OF DRILL HOLE NO. PR97-203

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/6/97 FINISHED: 5/15/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 98.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES

NOTE:
All measurements are from ground surface.

All measurements are in feet unless noted otherwise.

PURPOSE OF HOLE:
To determine physical properties of embankment and foundation materials.

DRILL RIG:
Truck-mounted CME-85 rotary drill rig.

DRILLER:
Mike McNamee; USBR

DRILLING METHOD:
0-4.5' advanced drill hole with 4-1/4" I.D. hollow stem auger (HSA) system and 5-foot-long inner barrel. 4.5-98.5' conducted SPT's (standard penetration tests); and cleaned out and advanced drill hole between SPT intervals with 4-1/4" I.D. HSA system and 5-foot-long inner barrel.

PROGRESS RECORD:

Date (1997)	Interval Drilled (ft)
5/6	0-16.0
5/7	16.0-53.5
5/14	53.5-86.0
5/15	86.0-98.5

CASING RECORD:
No casing used.

DRILLING FLUID:
No drill fluid used.

HOLE COMPLETION:
(5/15/97) Backfilled with "Holeplug" (coarse grade bentonite) from bottom of hole (98.5') up to ground surface.

LOCATION:
Dam station 6+06; centerline of dam.

DEPTH	% CORE RECOVERY	GEOL UNIT SYMBOL	USCS CLASS/LITH	ELEVATION	SPT	SO	% MOIST CONTENT
	100						
	67				11		12.5
	100						
10	100				14		14.0
	100						
	80				14		14.5
	100						
20	47				15		12.3
	100	Emb	CL				
	67				14		15.3
	100						
30	67				13		13.3
	100						
	53				18		13.2
	100						
40	100				20		13.8
	100						
	87			2673.5	15		11.8
	100				13		19.3
50	93				17		16.2
	100						
	53				13		16.3
	100				20		17.6
	100						17.2
	93				13		18.0
	100						
60	100				15		19.4
	100						
	100				16		19.3
	100				8		19.1
	100				11		17.8
70	100				5		18.6
	100						
	40	Qgt	CL		28		17.5
	100						
	60				6		18.7
	100						
	100				14		18.8
80	100				16		18.0
	100						
	100				13		18.4
	100				12		18.9
	100						
	100				14		18.5
90	100				10		18.9
	100						
	100				10		18.0
	100						
	100				1		18.6
	100			2621.5	4		17.4
		BOTTOM OF HOLE					

CLASSIFICATION AND PHYSICAL CONDITION

0.0-46.5' EMBANKMENT MATERIALS (Emb):

0.0-46.5' LEAN CLAY WITH SAND (CL). About 75-80% fines with medium plasticity, medium dry strength, medium toughness; about 20-25% fine to medium sand; trace of fine to coarse, hard, subrounded to rounded gravel; maximum size recovered, 1"; grey; moist; firm; some gravel consist of coal fragments; no reaction with HCl.

46.5-98.5' QUATERNARY GLACIAL TILL (Qgt):

46.5-98.5' LEAN CLAY WITH SAND AND COBBLES (CL). About 70-75% fines with medium plasticity; about 25% fine to coarse sand; trace to about 5% fine to coarse, hard, subrounded to rounded gravel; trace of cobbles; maximum size recovered, 3"+; grey; moist; firm; interbeds of Poorly Graded Sand (SP) from 52-52.5'; numerous gypsum crystals from 54.5-56' and 59.5-61'; no reaction with HCl.

Bottom of Hole - 98.5'

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. PR97-204

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/15/97 FINISHED: 5/18/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 98.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES

NOTE:
All measurements are from ground surface.

All measurements are in feet unless noted otherwise.

PURPOSE OF HOLE:
To determine physical properties of embankment and foundation materials.

DRILL RIG:
Truck-mounted CME-85 rotary drill rig.

DRILLER:
Mike McNamee; USBR

DRILLING METHOD:
0-4.5' advanced drill hole with 4-1/4" I.D. hollow stem auger (HSA) system and 5-foot-long inner barrel. 4.5-98.5' conducted SPT's (standard penetration tests); and cleaned out and advanced drill hole between SPT intervals with 4-1/4" I.D. HSA system and 5-foot-long inner barrel.

PROGRESS RECORD:

Date (1997)	Interval Drilled (ft)
5/15	0-31.0
5/17	31.0-76.0
5/18	76.0-98.5

CASING RECORD:
No casing used.

DRILLING FLUID:
No drill fluid used.

HOLE COMPLETION:
(5/18/97) Backfilled with "Holeplug" (coarse grade bentonite) from bottom of hole (98.5') up to ground surface.

LOCATION:
Dam station 4+96; centerline of dam.

DEPTH	% CORE RECOVERY	GEOL. UNIT SYMBL	FLD CLASS/LITH	ELEVATION	SPT 50	% MOIST CONTENT	CLASSIFICATION AND PHYSICAL CONDITION
	49						**0.0-41.0' EMBANKMENT MATERIAL (Emb):**
	53				•18	14.3	0.0-41.0' LEAN CLAY WITH SAND (CL). About 75-80% fines with medium plasticity, medium dry strength, medium toughness; about 20-25% fine to medium sand; trace of fine to coarse, hard, subrounded to rounded gravel; maximum size recovered, 1"; gray; moist; firm; some gravel consist of coal fragments; no reaction with HCl.
	100						
10	0				•14		
	100						
	60				•10	16.3	
	100						**41.0-98.5' QUATERNARY GLACIAL TILL (Qgt):**
20	53	Emb	CL		•19	15.5	41.0-98.5' LEAN CLAY WITH SAND AND COBBLES (CL). About 70-75% fines with medium plasticity, medium dry strength, medium toughness; about 25% fine to coarse sand; trace to about 5% fine to coarse, hard, subrounded to rounded gravel; trace of cobbles; maximum size recovered, 3"+; grey; moist; firm; fine grass roots from 43.5-49.5'; numerous gypsum crystals from 43.5-54.5'; no reaction with HCl.
	100						
	100				•20	17.0	
	100						
30	100				•21	16.1	
	100						
	100						
	87				•10	17.6	Bottom of Hole - 98.5'
	100				•6	19.1	
	100						
40	87			2579.0	•25	10.4	
	100					13.2	
	93				•20	16.2	
	100						
	87				•18	16.3	
	100						
	87				•18	16.0	
50	87						
	100				•23	16.9	
	100						
	100				•18	17.2	
	100						
	100				•21	16.9	
	100						
	100				•16	18.4	
	100						
60	47				•20	17.6	
	100						
	87				•11	17.5	
	100						
	100				•16	19.2	
	100						
	100				•16	17.6	
	100						
70	60	Qgt	CL		•14	16.2	
	100						
	100				•14	17.6	
	100						
	93				•10	18.3	
	100						
	100				•1	18.6	
	100						
80	93				•14	16.8	
	100						
	87				•13	16.1	
	100						
	100				•17	16.2	
	100						
	100				•12	16.0	
	100						
90	100				•11	15.7	
	100						
	100				•12	15.8	
	100						
	100			2523.5	•15	15.8	
	100						
	87				•8	16.1	
			BOTTOM OF HOLE				

COMMENTS:

GEOLOGIC LOG OF DRILL HOLE NO. PA97-205

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/19/97 FINISHED: 5/20/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 54.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES

NOTE:
All measurements are from ground surface.

All measurements are in feet unless noted otherwise.

PURPOSE OF HOLE:
To determine physical properties of embankment and foundation materials. To install porous tube piezometers in the foundation at the embankment/foundation contact.

DRILL RIG:
Truck-mounted CME-85 rotary drill rig.

DRILLER:
Mike McNeece: USBR

DRILLING METHOD:
0-4.5' advanced drill hole with 4-1/4" I.D. hollow stem auger (HSA) system and 5-foot-long inner barrel. 4.5-54.5' conducted SPT's (standard penetration tests); and cleaned out and advanced drill hole between SPT intervals with 4-1/4" I.D. HSA system and 5-foot-long inner barrel.

PROGRESS RECORD:

Date (1997)	Interval Drilled (ft)
5/19	0-54.5

CASING RECORD:
No casing used.

DRILLING FLUID:
No drill fluid used.

HOLE COMPLETION:
(5/20/97) Backfilled drill hole with "Holeplug" (coarse grade bentonite) from bottom of hole (54.5') up to 40.0'. Placed graded sand from 40.0' up to 38.0'. Installed a 2' porous tube piezometer (tip set at 38.0') with 3/4" I.D. PVC standpipe. Surrounded piezometer and standpipe with graded sand from 38.0' up to 34.0'. Backfilled drill hole with "Holeplug" from 34.0' up to 23.0' and placed graded sand from 23.0' up to 22.0'. Installed a 2'

COMMENTS:

DEPTH	% CORE RECOVERY	GEOL. UNIT SYMBOL	F.D. CLASS/LITH	ELEVATION	SPT	% MOIST CONTENT	CLASSIFICATION AND PHYSICAL CONDITION
	76						**0.0-21.0' EMBANKMENT MATERIAL (Emb):**
	53				•13	13.7	0.0-21.0' LEAN CLAY WITH SAND (CL). About 75-80% fines with medium plasticity, medium dry strength, medium toughness; about 20-25% fine to medium sand; trace of fine to coarse, hard, subrounded to rounded gravel; maximum size rescovered, 1"; gray; moist; firm; some gravel consist of coal fragments; no reaction with HCl.
	100						
10	67	Emb	CL		•17	13.5	
	100						
	67				•19	13.9	
	100						**21.0-49.5' QUATERNARY LACUSTRINE DEPOSITS (Ql):**
20	40			2699.0	•34	8.7	21.0-49.5' SANDY LEAN CLAY (CL). About 60-65% fines with low to medium plasticity, medium dry strength, low to medium toughness; about 30-35% fine to medium sand, with a trace of coarse sand; trace to about 5% coarse to mostly fine, hard, subrounded to rounded gravel; maximum size recovered, 1"; brown; moist; firm; numerous gypsum crystals from 26-42'; no reaction with HCl.
	100						
	53				•29	11.9	
	100						
	67				•30	12.3	
	100						
	73				•25	13.4	
	100						
30	100				•27	13.1	
	100						
	100				•23	12.9	
	100						
	100	Ql	CL		•22	14.8	**49.5-54.5' QUATERNARY GLACIAL TILL (Qgt):**
	100						
	93				•25	14.7	49.5-54.5' LEAN CLAY WITH SAND (CL). About 70-75% fines with medium plasticity, medium dry strength, medium toughness; about 25% fine to medium sand, with a trace of coarse sand; trace to about 5% fine to coarse, hard, subrounded to rounded gravel; maximum size recovered, 2-1/2"; gray; moist; firm; no reaction with HCl.
40	67				•20	14.6	
	100						
	100				•22	14.6	
	100						
	73				•16	13.8	
	100						
	80			2670.5	•22	15.1	Bottom of Hole - 54.5'
50	100				•19	15.3	
	50	Qgt	CL				
	0						
	80			2665.5	•20	13.8	
			BOTTOM OF HOLE				
60							

GEOLOGIC LOG OF DRILL HOLE NO. PR97-205

FEATURE: Anita Dam
LOCATION: Center Section; Crest of Dam
BEGUN: 5/19/97 FINISHED: 5/20/97
DEPTH AND ELEV. OF WATER LEVEL AND DATE MEASURED:

PROJECT:
COORDINATES: N E
TOTAL DEPTH: 54.5
DEPTH TO BEDROCK:

STATE: Montana
GROUND ELEVATION: 2720.0
ANGLE FROM HORIZONTAL: 90 AZIMUTH:
HOLE LOGGED BY: Jim Rogers
REVIEWED BY: L. Parish

NOTES	
porous tube piezometer (tip set at 22.0') with 3/4" I.D. PVC standpipe. Surrounded piezometer and standpipe with graded sand from 22.0' up to 18.0'. Placed "Holeplug" from 18.0' up to 4.0'. Installed utility access cover set in cement grout from 4.0' up to ground surface. LOCATION: Dam station 3+30; centerline of dam.	

APPENDIX C
SPT DATA SHEETS AND SUMMARY TABLE

SPT DATA SHEETS

PR97-201

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 5.00 TO: 6.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	5.00	To	5.20	0.20	0.20	1	1
From	5.20	To	5.30	0.10	0.30	1	2
From	5.30	To	5.40	0.10	0.40	1	3
From	5.40	To	5.50	0.10	0.50	1	4
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	5.50	To	5.60	0.10	0.10	2	2
From	5.60	To	5.70	0.10	0.20	2	4
From	5.70	To	5.80	0.10	0.30	1	5
From	5.80	To	5.90	0.10	0.40	1	6
From	5.90	To	6.00	0.10	0.50	2	8
From	6.00	To	6.10	0.10	0.60	2	10
From	6.10	To	6.20	0.10	0.70	1	11
From	6.20	To	6.30	0.10	0.80	2	13
From	6.30	To	6.40	0.10	0.90	2	15
From	6.40	To	6.50	0.10	1.00	2	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 10.00 TO: 11.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	10.00	To	10.20	0.20	0.20	1	1
From	10.20	To	10.30	0.10	0.30	1	2
From	10.30	To	10.40	0.10	0.40	2	4
From	10.40	To	10.50	0.10	0.50	1	5
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	10.50	To	10.60	0.10	0.10	1	1
From	10.60	To	10.70	0.10	0.20	2	3
From	10.70	To	10.80	0.10	0.30	1	4
From	10.80	To	10.90	0.10	0.40	2	6
From	10.90	To	11.00	0.10	0.50	2	8
From	11.00	To	11.10	0.10	0.60	1	9
From	11.10	To	11.20	0.10	0.70	3	12
From	11.20	To	11.30	0.10	0.80	2	14
From	11.30	To	11.40	0.10	0.90	2	16
From	11.40	To	11.50	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.1 PERCENT RECOVERY 73

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 15.00 TO: 16.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	15.00	To	15.10	0.10	0.10	1	1
From	15.10	To	15.20	0.10	0.20	1	2
From	15.20	To	15.30	0.10	0.30	2	4
From	15.30	To	15.40	0.10	0.40	2	6
From	15.40	To	15.50	0.10	0.50	1	7

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	15.50	To	15.60	0.10	0.10	1	1
From	15.60	To	15.70	0.10	0.20	1	2
From	15.70	To	15.80	0.10	0.30	2	4
From	15.80	To	15.90	0.10	0.40	1	5
From	15.90	To	16.00	0.10	0.50	2	7
From	16.00	To	16.10	0.10	0.60	2	9
From	16.10	To	16.20	0.10	0.70	2	11
From	16.20	To	16.30	0.10	0.80	2	13
From	16.30	To	16.40	0.10	0.90	3	16
From	16.40	To	16.50	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.9 PERCENT RECOVERY 57

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 35.00 TO: 36.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	35.00	To	35.10	0.10	0.10	1	1
From	35.10	To	35.20	0.10	0.20	1	2
From	35.20	To	35.30	0.10	0.30	1	3
From	35.30	To	35.40	0.10	0.40	1	4
From	35.40	To	35.50	0.10	0.50	2	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	35.50	To	35.60	0.10	0.10	1	1
From	35.60	To	35.70	0.10	0.20	1	2
From	35.70	To	35.80	0.10	0.30	1	3
From	35.80	To	35.90	0.10	0.40	2	5
From	35.90	To	36.00	0.10	0.50	1	6
From	36.00	To	36.10	0.10	0.60	2	8
From	36.10	To	36.20	0.10	0.70	1	9
From	36.20	To	36.30	0.10	0.80	2	11
From	36.30	To	36.40	0.10	0.90	2	13
From	36.40	To	36.50	0.10	1.00	2	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 39.50 TO: 41.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	39.50	To	39.60	0.10	0.10	1	1
From	39.60	To	39.70	0.10	0.20	1	2
From	39.70	To	39.80	0.10	0.30	1	3
From	39.80	To	39.90	0.10	0.40	1	4
From	39.90	To	40.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	40.00	To	40.10	0.10	0.10	1	1
From	40.10	To	40.20	0.10	0.20	1	2
From	40.20	To	40.30	0.10	0.30	2	4
From	40.30	To	40.40	0.10	0.40	1	5
From	40.40	To	40.50	0.10	0.50	2	7
From	40.50	To	40.60	0.10	0.60	2	9
From	40.60	To	40.70	0.10	0.70	2	11
From	40.70	To	40.80	0.10	0.80	2	13
From	40.80	To	40.90	0.10	0.90	2	15
From	40.90	To	41.00	0.10	1.00	2	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/01/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 42.00 TO: 43.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	42.00	To	42.10	0.10	0.10	1	1
From	42.10	To	42.20	0.10	0.20	1	2
From	42.20	To	42.30	0.10	0.30	1	3
From	42.30	To	42.40	0.10	0.40	1	4
From	42.40	To	42.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	42.50	To	42.60	0.10	0.10	1	1
From	42.60	To	42.70	0.10	0.20	1	2
From	42.70	To	42.80	0.10	0.30	1	3
From	42.80	To	42.90	0.10	0.40	2	5
From	42.90	To	43.00	0.10	0.50	2	7
From	43.00	To	43.10	0.10	0.60	1	8
From	43.10	To	43.20	0.10	0.70	2	10
From	43.20	To	43.30	0.10	0.80	2	12
From	43.30	To	43.40	0.10	0.90	3	15
From	43.40	To	43.50	0.10	1.00	2	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 44.50 TO: 46.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	44.50	To	44.60	0.10	0.10	1	1
From	44.60	To	44.70	0.10	0.20	1	2
From	44.70	To	44.80	0.10	0.30	1	3
From	44.80	To	44.90	0.10	0.40	1	4
From	44.90	To	45.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	45.00	To	45.10	0.10	0.10	2	2
From	45.10	To	45.20	0.10	0.20	1	3
From	45.20	To	45.30	0.10	0.30	2	5
From	45.30	To	45.40	0.10	0.40	1	6
From	45.40	To	45.50	0.10	0.50	2	8
From	45.50	To	45.60	0.10	0.60	3	11
From	45.60	To	45.70	0.10	0.70	2	13
From	45.70	To	45.80	0.10	0.80	2	15
From	45.80	To	45.90	0.10	0.90	2	17
From	45.90	To	46.00	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 48.00 TO: 49.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	48.00	To	48.10	0.10	0.10	1	1
From	48.10	To	48.20	0.10	0.20	1	2
From	48.20	To	48.30	0.10	0.30	1	3
From	48.30	To	48.40	0.10	0.40	1	4
From	48.40	To	48.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	48.50	To	48.60	0.10	0.10	2	2
From	48.60	To	48.70	0.10	0.20	1	3
From	48.70	To	48.80	0.10	0.30	2	5
From	48.80	To	48.90	0.10	0.40	1	6
From	48.90	To	49.00	0.10	0.50	2	8
From	49.00	To	49.10	0.10	0.60	2	10
From	49.10	To	49.20	0.10	0.70	2	12
From	49.20	To	49.30	0.10	0.80	2	14
From	49.30	To	49.40	0.10	0.90	1	15
From	49.40	To	49.50	0.10	1.00	2	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.7 PERCENT RECOVERY 47

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 50.50 TO: 52.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	50.50	To	50.60	0.10	0.10	3	3
From	50.60	To	50.70	0.10	0.20	3	6
From	50.70	To	50.80	0.10	0.30	2	8
From	50.80	To	50.90	0.10	0.40	2	10
From	50.90	To	51.00	0.10	0.50	1	11

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	51.00	To	51.10	0.10	0.10	1	1
From	51.10	To	51.20	0.10	0.20	2	3
From	51.20	To	51.30	0.10	0.30	2	5
From	51.30	To	51.40	0.10	0.40	2	7
From	51.40	To	51.50	0.10	0.50	2	9
From	51.50	To	51.60	0.10	0.60	1	10
From	51.60	To	51.70	0.10	0.70	2	12
From	51.70	To	51.80	0.10	0.80	2	14
From	51.80	To	51.90	0.10	0.90	2	16
From	51.90	To	52.00	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 53.00 TO: 54.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	53.00	To	53.10	0.10	0.10	1	1
From	53.10	To	53.20	0.10	0.20	2	3
From	53.20	To	53.30	0.10	0.30	1	4
From	53.30	To	53.40	0.10	0.40	1	5
From	53.40	To	53.50	0.10	0.50	1	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	53.50	To	53.60	0.10	0.10	1	1
From	53.60	To	53.70	0.10	0.20	1	2
From	53.70	To	53.80	0.10	0.30	1	3
From	53.80	To	53.90	0.10	0.40	1	4
From	53.90	To	54.00	0.10	0.50	1	5
From	54.00	To	54.10	0.10	0.60	2	7
From	54.10	To	54.20	0.10	0.70	1	8
From	54.20	To	54.30	0.10	0.80	1	9
From	54.30	To	54.40	0.10	0.90	2	11
From	54.40	To	54.50	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.6 PERCENT RECOVERY 40

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 55.50 TO: 57.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	55.50	To	56.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	56.00	To	57.00	1.00	1.00	0	0
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 0 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.5' (55.5-57.0')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH	FROM: 58.00	TO: 59.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	58.00	To	58.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	58.50	To	59.40	0.90	0.90	0	0
From	59.40	To	59.50	0.10	1.00	2	2
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 2 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 1.4' (58.0-59.4')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/02/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 62.00 TO: 63.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	62.00	To	62.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	62.50	To	63.10	0.60	0.60	0	0
From	63.10	To	63.20	0.10	0.70	1	1
From	63.20	To	63.30	0.10	0.80	1	2
From	63.30	To	63.40	0.10	0.90	1	3
From	63.40	To	63.50	0.10	1.00	2	5
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 5 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.1' (62.0-63.1')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/03/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 80.00 TO: 81.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	80.00	To	80.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	80.50	To	81.50	1.00	1.00	0	0
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 0 EXTRAPOLATED VAL. =

Description and classification of material.	Weight of drill rods pushed sampler 1.5' (80.0-81.5') in 1 minute

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/03/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 82.50 TO: 84.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	82.50	To	83.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	83.00	To	83.80	0.80	0.80	0	0
From	83.80	To	83.90	0.10	0.90	1	1
From	83.90	To	84.00	0.10	1.00	1	2
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 2 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 1.3' (82.5-83.8')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/03/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 85.00 TO: 86.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	85.00	To	85.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	85.50	To	86.20	0.70	0.70	0	0
From	86.20	To	86.30	0.10	0.80	2	2
From	86.30	To	86.40	0.10	0.90	2	4
From	86.40	To	86.50	0.10	1.00	1	5
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 5 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.2' (85.0-86.2')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/03/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 87.50 TO: 89.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	87.50	To	88.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	88.00	To	89.00	1.00	1.00	0	0
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 0 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.5' (87.5-89.0')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/03/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 90.00 TO: 91.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	90.00	To	90.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	90.50	To	91.50	1.00	1.00	0	0
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 0 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.5' (90.0-91.5')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 92.50 TO: 94.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	92.50	To	93.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	93.00	To	93.80	0.80	0.80	0	0
From	93.80	To	93.90	0.10	0.90	1	1
From	93.90	To	94.00	0.10	1.00	2	3
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 3 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.3' (92.5-93.8')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 95.00 TO: 96.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	95.00	To	95.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	95.50	To	96.20	0.70	0.70	0	0
From	96.20	To	96.30	0.10	0.80	1	1
From	96.30	To	96.40	0.10	0.90	2	3
From	96.40	To	96.50	0.10	1.00	1	4
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 4 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 1.2' (95.0-96.2')

SPT DATA SHEET

HOLE NO. PR97-201 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH	FROM: 97.50	TO: 99.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	97.50	To	98.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	98.00	To	99.00	1.00	1.00	0	0
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 0 EXTRAPOLATED VAL. =

Description and classification of material: Weight of drill rods pushed sampler 1.5' (97.5-99.0')

PR97-202

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 4.50 TO: 6.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	4.50	To	4.80	0.30	0.30	0	0
From	4.80	To	5.00	0.20	0.50	1	1
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	5.00	To	5.20	0.20	0.20	1	1
From	5.20	To	5.30	0.10	0.30	1	2
From	5.30	To	5.40	0.10	0.40	1	3
From	5.40	To	5.50	0.10	0.50	1	4
From	5.50	To	5.60	0.10	0.60	1	5
From	5.60	To	5.70	0.10	0.70	2	7
From	5.70	To	5.80	0.10	0.80	2	9
From	5.80	To	5.90	0.10	0.90	1	10
From	5.90	To	6.00	0.10	1.00	2	12
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material: Weight of drill rods pushed sampler 0.3' (4.5-4.8')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 9.50 TO: 11.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	9.50	To	9.70	0.20	0.20	0	0
From	9.70	To	9.80	0.10	0.30	1	1
From	9.80	To	9.90	0.10	0.40	1	2
From	9.90	To	10.00	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	10.00	To	10.10	0.10	0.10	1	1
From	10.10	To	10.20	0.10	0.20	1	2
From	10.20	To	10.30	0.10	0.30	1	3
From	10.30	To	10.40	0.10	0.40	1	4
From	10.40	To	10.50	0.10	0.50	2	6
From	10.50	To	10.60	0.10	0.60	1	7
From	10.60	To	10.70	0.10	0.70	1	8
From	10.70	To	10.80	0.10	0.80	2	10
From	10.80	To	10.90	0.10	0.90	2	12
From	10.90	To	11.00	0.10	1.00	3	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.2' (9.5-9.7')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 14.50 TO: 16.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	14.50	To	14.60	0.10	0.10	1	1
From	14.60	To	14.70	0.10	0.20	5	6
From	14.70	To	14.80	0.10	0.30	2	8
From	14.80	To	14.90	0.10	0.40	2	10
From	14.90	To	15.00	0.10	0.50	3	13

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	15.00	To	15.10	0.10	0.10	3	3
From	15.10	To	15.20	0.10	0.20	3	6
From	15.20	To	15.30	0.10	0.30	3	9
From	15.30	To	15.40	0.10	0.40	3	12
From	15.40	To	15.50	0.10	0.50	1	13
From	15.50	To	15.60	0.10	0.60	1	14
From	15.60	To	15.70	0.10	0.70	2	16
From	15.70	To	15.80	0.10	0.80	1	17
From	15.80	To	15.90	0.10	0.90	2	19
From	15.90	To	16.00	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.1 PERCENT RECOVERY 7

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material. Probably a rock in front of sampler

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 19.50 TO: 21.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	19.50	To	19.70	0.20	0.20	0	0
From	19.70	To	19.90	0.20	0.40	1	1
From	19.90	To	20.00	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	20.00	To	20.10	0.10	0.10	1	1
From	20.10	To	20.20	0.10	0.20	1	2
From	20.20	To	20.30	0.10	0.30	1	3
From	20.30	To	20.40	0.10	0.40	1	4
From	20.40	To	20.50	0.10	0.50	1	5
From	20.50	To	20.60	0.10	0.60	1	6
From	20.60	To	20.70	0.10	0.70	2	8
From	20.70	To	20.80	0.10	0.80	1	9
From	20.80	To	20.90	0.10	0.90	2	11
From	20.90	To	21.00	0.10	1.00	1	12

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.2' (19.5-19.7')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 24.50 TO: 26.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	24.50	To	24.60	0.10	0.10	1	1
From	24.60	To	24.70	0.10	0.20	1	2
From	24.70	To	24.80	0.10	0.30	1	3
From	24.80	To	24.90	0.10	0.40	1	4
From	24.90	To	25.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	25.00	To	25.10	0.10	0.10	1	1
From	25.10	To	25.20	0.10	0.20	1	2
From	25.20	To	25.30	0.10	0.30	1	3
From	25.30	To	25.40	0.10	0.40	2	5
From	25.40	To	25.50	0.10	0.50	1	6
From	25.50	To	25.60	0.10	0.60	2	8
From	25.60	To	25.70	0.10	0.70	1	9
From	25.70	To	25.80	0.10	0.80	2	11
From	25.80	To	25.90	0.10	0.90	2	13
From	25.90	To	26.00	0.10	1.00	3	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/04/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 29.50 TO: 31.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	29.50	To	29.60	0.10	0.10	1	1
From	29.60	To	29.70	0.10	0.20	1	2
From	29.70	To	29.80	0.10	0.30	1	3
From	29.80	To	29.90	0.10	0.40	2	5
From	29.90	To	30.00	0.10	0.50	1	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	30.00	To	30.10	0.10	0.10	1	1
From	30.10	To	30.20	0.10	0.20	2	3
From	30.20	To	30.30	0.10	0.30	2	5
From	30.30	To	30.40	0.10	0.40	2	7
From	30.40	To	30.50	0.10	0.50	2	9
From	30.50	To	30.60	0.10	0.60	2	11
From	30.60	To	30.70	0.10	0.70	2	13
From	30.70	To	30.80	0.10	0.80	3	16
From	30.80	To	30.90	0.10	0.90	3	19
From	30.90	To	31.00	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 32.00 TO: 33.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	32.00	To	32.10	0.10	0.10	1	1
From	32.10	To	32.20	0.10	0.20	1	2
From	32.20	To	32.30	0.10	0.30	1	3
From	32.30	To	32.40	0.10	0.40	1	4
From	32.40	To	32.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	32.50	To	32.60	0.10	0.10	1	1
From	32.60	To	32.70	0.10	0.20	1	2
From	32.70	To	32.80	0.10	0.30	1	3
From	32.80	To	32.90	0.10	0.40	1	4
From	32.90	To	33.00	0.10	0.50	1	5
From	33.00	To	33.10	0.10	0.60	1	6
From	33.10	To	33.20	0.10	0.70	1	7
From	33.20	To	33.30	0.10	0.80	1	8
From	33.30	To	33.40	0.10	0.90	2	10
From	33.40	To	33.50	0.10	1.00	2	12

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 34.50 TO: 36.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	34.50	To	34.60	0.10	0.10	1	1
From	34.60	To	34.70	0.10	0.20	1	2
From	34.70	To	34.80	0.10	0.30	1	3
From	34.80	To	34.90	0.10	0.40	1	4
From	34.90	To	35.00	0.10	0.50	2	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	35.00	To	35.10	0.10	0.10	1	1
From	35.10	To	35.20	0.10	0.20	1	2
From	35.20	To	35.30	0.10	0.30	1	3
From	35.30	To	35.40	0.10	0.40	2	5
From	35.40	To	35.50	0.10	0.50	2	7
From	35.50	To	35.60	0.10	0.60	2	9
From	35.60	To	35.70	0.10	0.70	3	12
From	35.70	To	35.80	0.10	0.80	3	15
From	35.80	To	35.90	0.10	0.90	3	18
From	35.90	To	36.00	0.10	1.00	3	21

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 21 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 37.00 TO: 38.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	37.00	To	37.10	0.10	0.10	1	1
From	37.10	To	37.20	0.10	0.20	1	2
From	37.20	To	37.30	0.10	0.30	1	3
From	37.30	To	37.40	0.10	0.40	1	4
From	37.40	To	37.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	37.50	To	37.60	0.10	0.10	2	2
From	37.60	To	37.70	0.10	0.20	1	3
From	37.70	To	37.80	0.10	0.30	2	5
From	37.80	To	37.90	0.10	0.40	2	7
From	37.90	To	38.00	0.10	0.50	2	9
From	38.00	To	38.10	0.10	0.60	2	11
From	38.10	To	38.20	0.10	0.70	2	13
From	38.20	To	38.30	0.10	0.80	2	15
From	38.30	To	38.40	0.10	0.90	3	18
From	38.40	To	38.50	0.10	1.00	3	21

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 21 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 39.50 TO: 41.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	39.50	To	39.60	0.10	0.10	1	1
From	39.60	To	39.70	0.10	0.20	1	2
From	39.70	To	39.80	0.10	0.30	1	3
From	39.80	To	39.90	0.10	0.40	1	4
From	39.90	To	40.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	40.00	To	40.10	0.10	0.10	1	1
From	40.10	To	40.20	0.10	0.20	2	3
From	40.20	To	40.30	0.10	0.30	2	5
From	40.30	To	40.40	0.10	0.40	2	7
From	40.40	To	40.50	0.10	0.50	2	9
From	40.50	To	40.60	0.10	0.60	3	12
From	40.60	To	40.70	0.10	0.70	2	14
From	40.70	To	40.80	0.10	0.80	3	17
From	40.80	To	40.90	0.10	0.90	3	20
From	40.90	To	41.00	0.10	1.00	3	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 42.00 TO: 43.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	42.00	To	42.10	0.10	0.10	1	1
From	42.10	To	42.20	0.10	0.20	1	2
From	42.20	To	42.30	0.10	0.30	1	3
From	42.30	To	42.40	0.10	0.40	1	4
From	42.40	To	42.50	0.10	0.50	2	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	42.50	To	42.60	0.10	0.10	1	1
From	42.60	To	42.70	0.10	0.20	2	3
From	42.70	To	42.80	0.10	0.30	2	5
From	42.80	To	42.90	0.10	0.40	3	8
From	42.90	To	43.00	0.10	0.50	2	10
From	43.00	To	43.10	0.10	0.60	2	12
From	43.10	To	43.20	0.10	0.70	3	15
From	43.20	To	43.30	0.10	0.80	3	18
From	43.30	To	43.40	0.10	0.90	3	21
From	43.40	To	43.50	0.10	1.00	3	24

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 24 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 44.50 TO: 46.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	44.50	To	44.60	0.10	0.10	1	1
From	44.60	To	44.70	0.10	0.20	1	2
From	44.70	To	44.80	0.10	0.30	1	3
From	44.80	To	44.90	0.10	0.40	1	4
From	44.90	To	45.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	45.00	To	45.10	0.10	0.10	1	1
From	45.10	To	45.20	0.10	0.20	2	3
From	45.20	To	45.30	0.10	0.30	2	5
From	45.30	To	45.40	0.10	0.40	2	7
From	45.40	To	45.50	0.10	0.50	2	9
From	45.50	To	45.60	0.10	0.60	2	11
From	45.60	To	45.70	0.10	0.70	3	14
From	45.70	To	45.80	0.10	0.80	2	16
From	45.80	To	45.90	0.10	0.90	3	19
From	45.90	To	46.00	0.10	1.00	4	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 47.00 TO: 48.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	47.00	To	47.10	0.10	0.10	1	1
From	47.10	To	47.20	0.10	0.20	1	2
From	47.20	To	47.30	0.10	0.30	1	3
From	47.30	To	47.40	0.10	0.40	1	4
From	47.40	To	47.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	47.50	To	47.60	0.10	0.10	1	1
From	47.60	To	47.70	0.10	0.20	1	2
From	47.70	To	47.80	0.10	0.30	1	3
From	47.80	To	47.90	0.10	0.40	2	5
From	47.90	To	48.00	0.10	0.50	2	7
From	48.00	To	48.10	0.10	0.60	2	9
From	48.10	To	48.20	0.10	0.70	2	11
From	48.20	To	48.30	0.10	0.80	3	14
From	48.30	To	48.40	0.10	0.90	3	17
From	48.40	To	48.50	0.10	1.00	2	19

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 19 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 49.50 TO: 51.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	49.50	To	49.60	0.10	0.10	1	1
From	49.60	To	49.70	0.10	0.20	1	2
From	49.70	To	49.80	0.10	0.30	1	3
From	49.80	To	49.90	0.10	0.40	1	4
From	49.90	To	50.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	50.00	To	50.10	0.10	0.10	2	2
From	50.10	To	50.20	0.10	0.20	2	4
From	50.20	To	50.30	0.10	0.30	2	6
From	50.30	To	50.40	0.10	0.40	2	8
From	50.40	To	50.50	0.10	0.50	2	10
From	50.50	To	50.60	0.10	0.60	2	12
From	50.60	To	50.70	0.10	0.70	3	15
From	50.70	To	50.80	0.10	0.80	2	17
From	50.80	To	50.90	0.10	0.90	3	20
From	50.90	To	51.00	0.10	1.00	3	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 52.00 TO: 53.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	52.00	To	52.10	0.10	0.10	1	1
From	52.10	To	52.20	0.10	0.20	1	2
From	52.20	To	52.30	0.10	0.30	1	3
From	52.30	To	52.40	0.10	0.40	1	4
From	52.40	To	52.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	52.50	To	52.60	0.10	0.10	1	1
From	52.60	To	52.70	0.10	0.20	2	3
From	52.70	To	52.80	0.10	0.30	2	5
From	52.80	To	52.90	0.10	0.40	2	7
From	52.90	To	53.00	0.10	0.50	2	9
From	53.00	To	53.10	0.10	0.60	2	11
From	53.10	To	53.20	0.10	0.70	3	14
From	53.20	To	53.30	0.10	0.80	3	17
From	53.30	To	53.40	0.10	0.90	2	19
From	53.40	To	53.50	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 54.50 TO: 56.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	54.50	To	54.60	0.10	0.10	1	1
From	54.60	To	54.70	0.10	0.20	1	2
From	54.70	To	54.80	0.10	0.30	1	3
From	54.80	To	54.90	0.10	0.40	1	4
From	54.90	To	55.00	0.10	0.50	2	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	55.00	To	55.10	0.10	0.10	1	1
From	55.10	To	55.20	0.10	0.20	2	3
From	55.20	To	55.30	0.10	0.30	2	5
From	55.30	To	55.40	0.10	0.40	2	7
From	55.40	To	55.50	0.10	0.50	3	10
From	55.50	To	55.60	0.10	0.60	2	12
From	55.60	To	55.70	0.10	0.70	3	15
From	55.70	To	55.80	0.10	0.80	2	17
From	55.80	To	55.90	0.10	0.90	3	20
From	55.90	To	56.00	0.10	1.00	4	24

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 24 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 57.00 TO: 58.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	57.00	To	57.10	0.10	0.10	1	1
From	57.10	To	57.20	0.10	0.20	1	2
From	57.20	To	57.30	0.10	0.30	1	3
From	57.30	To	57.40	0.10	0.40	1	4
From	57.40	To	57.50	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	57.50	To	57.60	0.10	0.10	1	1
From	57.60	To	57.70	0.10	0.20	2	3
From	57.70	To	57.80	0.10	0.30	2	5
From	57.80	To	57.90	0.10	0.40	2	7
From	57.90	To	58.00	0.10	0.50	3	10
From	58.00	To	58.10	0.10	0.60	2	12
From	58.10	To	58.20	0.10	0.70	3	15
From	58.20	To	58.30	0.10	0.80	2	17
From	58.30	To	58.40	0.10	0.90	3	20
From	58.40	To	58.50	0.10	1.00	3	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 59.50 TO: 61.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	59.50	To	60.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	60.00	To	60.10	0.10	0.10	1	1
From	60.10	To	60.20	0.10	0.20	1	2
From	60.20	To	60.30	0.10	0.30	2	4
From	60.30	To	60.40	0.10	0.40	1	5
From	60.40	To	60.50	0.10	0.50	1	6
From	60.50	To	60.60	0.10	0.60	2	8
From	60.60	To	60.70	0.10	0.70	1	9
From	60.70	To	60.80	0.10	0.80	2	11
From	60.80	To	60.90	0.10	0.90	2	13
From	60.90	To	61.00	0.10	1.00	3	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material: Weight of drill rods pushed sampler 0.5' (59.5-60.0')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 62.00 TO: 63.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	62.00	To	62.10	0.10	0.10	1	1
From	62.10	To	62.20	0.10	0.20	1	2
From	62.20	To	62.30	0.10	0.30	1	3
From	62.30	To	62.40	0.10	0.40	1	4
From	62.40	To	62.50	0.10	0.50	2	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	62.50	To	62.60	0.10	0.10	6	6
From	62.60	To	62.70	0.10	0.20	5	11
From	62.70	To	62.80	0.10	0.30	4	15
From	62.80	To	62.90	0.10	0.40	3	18
From	62.90	To	63.00	0.10	0.50	3	21
From	63.00	To	63.10	0.10	0.60	2	23
From	63.10	To	63.20	0.10	0.70	2	25
From	63.20	To	63.30	0.10	0.80	3	28
From	63.30	To	63.40	0.10	0.90	3	31
From	63.40	To	63.50	0.10	1.00	3	34

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 34 EXTRAPOLATED VAL. =

Description and classification of material: Rock at 62.7'

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 64.50 TO: 66.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	64.50	To	64.70	0.20	0.20	0	0
From	64.70	To	64.80	0.10	0.30	1	1
From	64.80	To	64.90	0.10	0.40	1	2
From	64.90	To	65.00	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	65.00	To	65.10	0.10	0.10	1	1
From	65.10	To	65.20	0.10	0.20	2	3
From	65.20	To	65.30	0.10	0.30	2	5
From	65.30	To	65.40	0.10	0.40	2	7
From	65.40	To	65.50	0.10	0.50	3	10
From	65.50	To	65.60	0.10	0.60	1	11
From	65.60	To	65.70	0.10	0.70	3	14
From	65.70	To	65.80	0.10	0.80	2	16
From	65.80	To	65.90	0.10	0.90	4	20
From	65.90	To	66.00	0.10	1.00	3	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.9 PERCENT RECOVERY 60

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.2' (64.5-64.7')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/05/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 67.00 TO: 68.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	67.00	To	67.10	0.10	0.10	0	0
From	67.10	To	67.20	0.10	0.20	1	1
From	67.20	To	67.30	0.10	0.30	1	2
From	67.30	To	67.40	0.10	0.40	1	3
From	67.40	To	67.50	0.10	0.50	1	4

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	67.50	To	67.60	0.10	0.10	2	2
From	67.60	To	67.70	0.10	0.20	1	3
From	67.70	To	67.80	0.10	0.30	2	5
From	67.80	To	67.90	0.10	0.40	3	8
From	67.90	To	68.00	0.10	0.50	2	10
From	68.00	To	68.10	0.10	0.60	2	12
From	68.10	To	68.20	0.10	0.70	2	14
From	68.20	To	68.30	0.10	0.80	2	16
From	68.30	To	68.40	0.10	0.90	3	19
From	68.40	To	68.50	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.	Weight of drill rods pushed sampler 0.1' (67.0-67.1')

SPT DATA SHEET

HOLE NO. PR97-202 **DATE** 05/06/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 69.50 TO: 71.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	69.50	To	69.70	0.20	0.20	1	1
From	69.70	To	69.80	0.10	0.30	1	2
From	69.80	To	69.90	0.10	0.40	1	3
From	69.90	To	70.00	0.10	0.50	2	5
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	70.00	To	70.10	0.10	0.10	2	2
From	70.10	To	70.20	0.10	0.20	1	3
From	70.20	To	70.30	0.10	0.30	2	5
From	70.30	To	70.40	0.10	0.40	2	7
From	70.40	To	70.50	0.10	0.50	2	9
From	70.50	To	70.60	0.10	0.60	1	10
From	70.60	To	70.70	0.10	0.70	3	13
From	70.70	To	70.80	0.10	0.80	2	15
From	70.80	To	70.90	0.10	0.90	3	18
From	70.90	To	71.00	0.10	1.00	3	21

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 21 EXTRAPOLATED VAL. =

Description and classification of material.

PR97-203

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/06/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 4.50 TO: 6.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	4.50	To	4.70	0.20	0.20	1	1
From	4.70	To	4.80	0.10	0.30	1	2
From	4.80	To	4.90	0.10	0.40	1	3
From	4.90	To	5.00	0.10	0.50	2	5
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	5.00	To	5.10	0.10	0.10	1	1
From	5.10	To	5.20	0.10	0.20	1	2
From	5.20	To	5.30	0.10	0.30	1	3
From	5.30	To	5.40	0.10	0.40	1	4
From	5.40	To	5.50	0.10	0.50	1	5
From	5.50	To	5.60	0.10	0.60	1	6
From	5.60	To	5.70	0.10	0.70	1	7
From	5.70	To	5.80	0.10	0.80	1	8
From	5.80	To	5.90	0.10	0.90	1	9
From	5.90	To	6.00	0.10	1.00	2	11

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 11 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/06/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH	FROM: 9.50	TO: 11.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	9.50	To	9.80	0.30	0.30	0	0
From	9.80	To	9.90	0.10	0.40	1	1
From	9.90	To	10.00	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	10.00	To	10.10	0.10	0.10	1	1
From	10.10	To	10.20	0.10	0.20	1	2
From	10.20	To	10.30	0.10	0.30	1	3
From	10.30	To	10.40	0.10	0.40	1	4
From	10.40	To	10.50	0.10	0.50	2	6
From	10.50	To	10.60	0.10	0.60	1	7
From	10.60	To	10.70	0.10	0.70	2	9
From	10.70	To	10.80	0.10	0.80	1	10
From	10.80	To	10.90	0.10	0.90	2	12
From	10.90	To	11.00	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material.	Weight of drill rods pushed sampler 0.3' (9.5-9.8')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/06/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 14.50 TO: 16.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	14.50	To	14.70	0.20	0.20	1	1
From	14.70	To	14.90	0.20	0.40	1	2
From	14.90	To	15.00	0.10	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	15.00	To	15.10	0.10	0.10	1	1
From	15.10	To	15.20	0.10	0.20	1	2
From	15.20	To	15.30	0.10	0.30	1	3
From	15.30	To	15.40	0.10	0.40	1	4
From	15.40	To	15.50	0.10	0.50	2	6
From	15.50	To	15.60	0.10	0.60	1	7
From	15.60	To	15.70	0.10	0.70	1	8
From	15.70	To	15.80	0.10	0.80	2	10
From	15.80	To	15.90	0.10	0.90	2	12
From	15.90	To	16.00	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 19.50 TO: 21.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	19.50	To	19.70	0.20	0.20	1	1
From	19.70	To	19.80	0.10	0.30	1	2
From	19.80	To	19.90	0.10	0.40	2	4
From	19.90	To	20.00	0.10	0.50	2	6
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	20.00	To	20.10	0.10	0.10	1	1
From	20.10	To	20.20	0.10	0.20	1	2
From	20.20	To	20.30	0.10	0.30	1	3
From	20.30	To	20.40	0.10	0.40	1	4
From	20.40	To	20.50	0.10	0.50	1	5
From	20.50	To	20.60	0.10	0.60	2	7
From	20.60	To	20.70	0.10	0.70	1	8
From	20.70	To	20.80	0.10	0.80	2	10
From	20.80	To	20.90	0.10	0.90	2	12
From	20.90	To	21.00	0.10	1.00	3	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.7 PERCENT RECOVERY 47

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 24.50 TO: 26.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	24.50	To	24.80	0.30	0.30	1	1
From	24.80	To	24.90	0.10	0.40	1	2
From	24.90	To	25.00	0.10	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	25.00	To	25.10	0.10	0.10	1	1
From	25.10	To	25.20	0.10	0.20	1	2
From	25.20	To	25.30	0.10	0.30	1	3
From	25.30	To	25.40	0.10	0.40	1	4
From	25.40	To	25.50	0.10	0.50	2	6
From	25.50	To	25.60	0.10	0.60	1	7
From	25.60	To	25.70	0.10	0.70	1	8
From	25.70	To	25.80	0.10	0.80	2	10
From	25.80	To	25.90	0.10	0.90	2	12
From	25.90	To	26.00	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 29.50 TO: 31.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	29.50	To	29.80	0.30	0.30	1	1
From	29.80	To	29.90	0.10	0.40	1	2
From	29.90	To	30.00	0.10	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	30.00	To	30.10	0.10	0.10	1	1
From	30.10	To	30.20	0.10	0.20	1	2
From	30.20	To	30.30	0.10	0.30	1	3
From	30.30	To	30.40	0.10	0.40	2	5
From	30.40	To	30.50	0.10	0.50	1	6
From	30.50	To	30.60	0.10	0.60	1	7
From	30.60	To	30.70	0.10	0.70	1	8
From	30.70	To	30.80	0.10	0.80	2	10
From	30.80	To	30.90	0.10	0.90	1	11
From	30.90	To	31.00	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 34.50 TO: 36.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	34.50	To	34.60	0.10	0.10	1	1
From	34.60	To	34.70	0.10	0.20	1	2
From	34.70	To	34.80	0.10	0.30	1	3
From	34.80	To	34.90	0.10	0.40	1	4
From	34.90	To	35.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	35.00	To	35.10	0.10	0.10	1	1
From	35.10	To	35.20	0.10	0.20	2	3
From	35.20	To	35.30	0.10	0.30	2	5
From	35.30	To	35.40	0.10	0.40	1	6
From	35.40	To	35.50	0.10	0.50	2	8
From	35.50	To	35.60	0.10	0.60	2	10
From	35.60	To	35.70	0.10	0.70	2	12
From	35.70	To	35.80	0.10	0.80	2	14
From	35.80	To	35.90	0.10	0.90	2	16
From	35.90	To	36.00	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 39.50 TO: 41.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	39.50	To	39.70	0.20	0.20	1	1
From	39.70	To	39.80	0.10	0.30	1	2
From	39.80	To	39.90	0.10	0.40	1	3
From	39.90	To	40.00	0.10	0.50	1	4
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	40.00	To	40.10	0.10	0.10	2	2
From	40.10	To	40.20	0.10	0.20	1	3
From	40.20	To	40.30	0.10	0.30	2	5
From	40.30	To	40.40	0.10	0.40	2	7
From	40.40	To	40.50	0.10	0.50	1	8
From	40.50	To	40.60	0.10	0.60	2	10
From	40.60	To	40.70	0.10	0.70	1	11
From	40.70	To	40.80	0.10	0.80	3	14
From	40.80	To	40.90	0.10	0.90	3	17
From	40.90	To	41.00	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 44.50 TO: 46.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	44.50	To	44.60	0.10	0.10	1	1
From	44.60	To	44.70	0.10	0.20	1	2
From	44.70	To	44.80	0.10	0.30	1	3
From	44.80	To	44.90	0.10	0.40	1	4
From	44.90	To	45.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	45.00	To	45.10	0.10	0.10	2	2
From	45.10	To	45.20	0.10	0.20	2	4
From	45.20	To	45.30	0.10	0.30	1	5
From	45.30	To	45.40	0.10	0.40	1	6
From	45.40	To	45.50	0.10	0.50	1	7
From	45.50	To	45.60	0.10	0.60	1	8
From	45.60	To	45.70	0.10	0.70	2	10
From	45.70	To	45.80	0.10	0.80	2	12
From	45.80	To	45.90	0.10	0.90	2	14
From	45.90	To	46.00	0.10	1.00	1	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 47.00 TO: 48.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	47.00	To	47.20	0.20	0.20	1	1
From	47.20	To	47.30	0.10	0.30	1	2
From	47.30	To	47.50	0.20	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	47.50	To	47.60	0.10	0.10	1	1
From	47.60	To	47.70	0.10	0.20	1	2
From	47.70	To	47.80	0.10	0.30	1	3
From	47.80	To	47.90	0.10	0.40	1	4
From	47.90	To	48.00	0.10	0.50	1	5
From	48.00	To	48.10	0.10	0.60	2	7
From	48.10	To	48.20	0.10	0.70	1	8
From	48.20	To	48.30	0.10	0.80	2	10
From	48.30	To	48.40	0.10	0.90	1	11
From	48.40	To	48.50	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 49.50 TO: 51.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	49.50	To	49.70	0.20	0.20	1	1
From	49.70	To	49.80	0.10	0.30	1	2
From	49.80	To	50.00	0.20	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	50.00	To	50.10	0.10	0.10	1	1
From	50.10	To	50.20	0.10	0.20	2	3
From	50.20	To	50.30	0.10	0.30	1	4
From	50.30	To	50.40	0.10	0.40	2	6
From	50.40	To	50.50	0.10	0.50	2	8
From	50.50	To	50.60	0.10	0.60	1	9
From	50.60	To	50.70	0.10	0.70	2	11
From	50.70	To	50.80	0.10	0.80	2	13
From	50.80	To	50.90	0.10	0.90	1	14
From	50.90	To	51.00	0.10	1.00	3	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/07/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 52.00 TO: 53.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	52.00	To	52.40	0.40	0.40	1	1
From	52.40	To	52.50	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	52.50	To	52.60	0.10	0.10	1	1
From	52.60	To	52.70	0.10	0.20	1	2
From	52.70	To	52.80	0.10	0.30	1	3
From	52.80	To	52.90	0.10	0.40	1	4
From	52.90	To	53.00	0.10	0.50	1	5
From	53.00	To	53.10	0.10	0.60	1	6
From	53.10	To	53.20	0.10	0.70	1	7
From	53.20	To	53.30	0.10	0.80	1	8
From	53.30	To	53.40	0.10	0.90	2	10
From	53.40	To	53.50	0.10	1.00	3	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.3' (52.0-52.3')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 54.50 TO: 56.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	54.50	To	54.70	0.20	0.20	1	1
From	54.70	To	54.80	0.10	0.30	1	2
From	54.80	To	54.90	0.10	0.40	1	3
From	54.90	To	55.00	0.10	0.50	1	4
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	55.00	To	55.10	0.10	0.10	1	1
From	55.10	To	55.20	0.10	0.20	2	3
From	55.20	To	55.30	0.10	0.30	1	4
From	55.30	To	55.40	0.10	0.40	2	6
From	55.40	To	55.50	0.10	0.50	2	8
From	55.50	To	55.60	0.10	0.60	2	10
From	55.60	To	55.70	0.10	0.70	2	12
From	55.70	To	55.80	0.10	0.80	2	14
From	55.80	To	55.90	0.10	0.90	3	17
From	55.90	To	56.00	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 57.00 TO: 58.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	57.00	To	57.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	57.50	To	57.60	0.10	0.10	0	0
From	57.60	To	57.70	0.10	0.20	1	1
From	57.70	To	57.80	0.10	0.30	1	2
From	57.80	To	57.90	0.10	0.40	1	3
From	57.90	To	58.00	0.10	0.50	1	4
From	58.00	To	58.10	0.10	0.60	1	5
From	58.10	To	58.20	0.10	0.70	2	7
From	58.20	To	58.30	0.10	0.80	2	9
From	58.30	To	58.40	0.10	0.90	2	11
From	58.40	To	58.50	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.6' (57.0-57.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 59.50 TO: 61.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	59.50	To	60.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	60.00	To	60.10	0.10	0.10	0	0
From	60.10	To	60.20	0.10	0.20	1	1
From	60.20	To	60.30	0.10	0.30	1	2
From	60.30	To	60.40	0.10	0.40	1	3
From	60.40	To	60.50	0.10	0.50	1	4
From	60.50	To	60.60	0.10	0.60	2	6
From	60.60	To	60.70	0.10	0.70	2	8
From	60.70	To	60.80	0.10	0.80	3	11
From	60.80	To	60.90	0.10	0.90	° 2	13
From	60.90	To	61.00	0.10	1.00	2	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (59.5-60.1')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 62.00 TO: 63.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	62.00	To	62.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	62.50	To	62.60	0.10	0.10	0	0
From	62.60	To	62.70	0.10	0.20	1	1
From	62.70	To	62.80	0.10	0.30	2	3
From	62.80	To	62.90	0.10	0.40	1	4
From	62.90	To	63.00	0.10	0.50	1	5
From	63.00	To	63.10	0.10	0.60	2	7
From	63.10	To	63.20	0.10	0.70	2	9
From	63.20	To	63.30	0.10	0.80	2	11
From	63.30	To	63.40	0.10	0.90	2	13
From	63.40	To	63.50	0.10	1.00	3	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (62.0-62.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 64.50 TO: 66.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	64.50	To	65.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	65.00	To	65.60	0.60	0.60	0	0
From	65.60	To	65.70	0.10	0.70	2	2
From	65.70	To	65.80	0.10	0.80	2	4
From	65.80	To	65.90	0.10	0.90	2	6
From	65.90	To	66.00	0.10	1.00	2	8
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 8 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.1' (64.5-65.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 67.00 TO: 68.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	67.00	To	67.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	67.50	To	67.60	0.10	0.10	1	1
From	67.60	To	67.70	0.10	0.20	1	2
From	67.70	To	67.80	0.10	0.30	1	3
From	67.80	To	67.90	0.10	0.40	1	4
From	67.90	To	68.00	0.10	0.50	1	5
From	68.00	To	68.10	0.10	0.60	1	6
From	68.10	To	68.20	0.10	0.70	2	8
From	68.20	To	68.30	0.10	0.80	1	9
From	68.30	To	68.40	0.10	0.90	1	10
From	68.40	To	68.50	0.10	1.00	1	11

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 11 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.5' (67.0-67.5')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 69.50 TO: 71.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	69.50	To	70.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	70.00	To	70.50	0.50	0.50	0	0
From	70.50	To	70.60	0.10	0.60	1	1
From	70.60	To	70.70	0.10	0.70	1	2
From	70.70	To	70.80	0.10	0.80	1	3
From	70.80	To	70.90	0.10	0.90	1	4
From	70.90	To	71.00	0.10	1.00	1	5
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 5 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 1.0' (69.5-70.5')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 72.00 TO: 73.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	72.00	To	72.40	0.40	0.40	0	0
From	72.40	To	72.50	0.10	0.50	2	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	72.50	To	72.60	0.10	0.10	2	2
From	72.60	To	72.70	0.10	0.20	4	6
From	72.70	To	72.80	0.10	0.30	3	9
From	72.80	To	72.90	0.10	0.40	2	11
From	72.90	To	73.00	0.10	0.50	2	13
From	73.00	To	73.10	0.10	0.60	3	16
From	73.10	To	73.20	0.10	0.70	3	19
From	73.20	To	73.30	0.10	0.80	3	22
From	73.30	To	73.40	0.10	0.90	3	25
From	73.40	To	73.50	0.10	1.00	3	28

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.6 PERCENT RECOVERY 40

TOTAL BLOWS (after seating) 28 EXTRAPOLATED VAL. =

Description and classification of material. Rock in shoe of sampler

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 74.50 TO: 76.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	74.50	To	75.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	75.00	To	75.60	0.60	0.60	1	1
From	75.60	To	75.70	0.10	0.70	2	3
From	75.70	To	75.80	0.10	0.80	1	4
From	75.80	To	75.90	0.10	0.90	1	5
From	75.90	To	76.00	0.10	1.00	1	6
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.9 PERCENT RECOVERY 60

TOTAL BLOWS (after seating) 6 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 77.00 TO: 78.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	77.00	To	77.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	77.50	To	77.60	0.10	0.10	0	0
From	77.60	To	77.70	0.10	0.20	1	1
From	77.70	To	77.80	0.10	0.30	1	2
From	77.80	To	77.90	0.10	0.40	1	3
From	77.90	To	78.00	0.10	0.50	2	5
From	78.00	To	78.10	0.10	0.60	1	6
From	78.10	To	78.20	0.10	0.70	2	8
From	78.20	To	78.30	0.10	0.80	2	10
From	78.30	To	78.40	0.10	0.90	2	12
From	78.40	To	78.50	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (77.0-77.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 79.50 TO: 81.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	79.50	To	79.60	0.10	0.10	0	0
From	79.60	To	80.00	0.40	0.50	1	1
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	80.00	To	80.10	0.10	0.10	1	1
From	80.10	To	80.20	0.10	0.20	1	2
From	80.20	To	80.30	0.10	0.30	1	3
From	80.30	To	80.40	0.10	0.40	2	5
From	80.40	To	80.50	0.10	0.50	1	6
From	80.50	To	80.60	0.10	0.60	2	8
From	80.60	To	80.70	0.10	0.70	2	10
From	80.70	To	80.80	0.10	0.80	2	12
From	80.80	To	80.90	0.10	0.90	2	14
From	80.90	To	81.00	0.10	1.00	2	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.1' (79.5-79.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 82.00 TO: 83.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	82.00	To	82.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	82.50	To	82.60	0.10	0.10	0	0
From	82.60	To	82.70	0.10	0.20	1	1
From	82.70	To	82.80	0.10	0.30	1	2
From	82.80	To	82.90	0.10	0.40	2	4
From	82.90	To	83.00	0.10	0.50	1	5
From	83.00	To	83.10	0.10	0.60	1	6
From	83.10	To	83.20	0.10	0.70	2	8
From	83.20	To	83.30	0.10	0.80	1	9
From	83.30	To	83.40	0.10	0.90	2	11
From	83.40	To	83.50	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.	Weight of drill rods pushed sampler 0.6' (82.0-82.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/14/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 84.50 TO: 86.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	84.50	To	85.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	85.00	To	85.30	0.30	0.30	0	0
From	85.30	To	85.40	0.10	0.40	2	2
From	85.40	To	85.50	0.10	0.50	1	3
From	85.50	To	85.60	0.10	0.60	2	5
From	85.60	To	85.70	0.10	0.70	1	6
From	85.70	To	85.80	0.10	0.80	2	8
From	85.80	To	85.90	0.10	0.90	2	10
From	85.90	To	86.00	0.10	1.00	2	12
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.8' (84.5-85.3')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 87.00 TO: 88.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	87.00	To	87.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	87.50	To	87.60	0.10	0.10	0	0
From	87.60	To	87.70	0.10	0.20	1	1
From	87.70	To	87.80	0.10	0.30	1	2
From	87.80	To	87.90	0.10	0.40	1	3
From	87.90	To	88.00	0.10	0.50	2	5
From	88.00	To	88.10	0.10	0.60	2	7
From	88.10	To	88.20	0.10	0.70	1	8
From	88.20	To	88.30	0.10	0.80	2	10
From	88.30	To	88.40	0.10	0.90	2	12
From	88.40	To	88.50	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (87.0-87.6')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 89.50 TO: 91.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	89.50	To	90.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	90.00	To	90.30	0.30	0.30	0	0
From	90.30	To	90.40	0.10	0.40	1	1
From	90.40	To	90.50	0.10	0.50	1	2
From	90.50	To	90.60	0.10	0.60	1	3
From	90.60	To	90.70	0.10	0.70	2	5
From	90.70	To	90.80	0.10	0.80	1	6
From	90.80	To	90.90	0.10	0.90	2	8
From	90.90	To	91.00	0.10	1.00	2	10
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 10 EXTRAPOLATED VAL. =

Description and classification of material.	
	Weight of drill rods pushed sampler 0.8' (89.5-90.3')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 92.00 TO: 93.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	92.00	To	92.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	92.50	To	92.80	0.30	0.30	0	0
From	92.80	To	92.90	0.10	0.40	1	1
From	92.90	To	93.00	0.10	0.50	1	2
From	93.00	To	93.10	0.10	0.60	2	4
From	93.10	To	93.20	0.10	0.70	1	5
From	93.20	To	93.30	0.10	0.80	1	6
From	93.30	To	93.40	0.10	0.90	2	8
From	93.40	To	93.50	0.10	1.00	2	10
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 10 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.8' (92.0-92.8')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 94.50 TO: 96.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	94.50	To	95.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	95.00	To	95.90	0.90	0.90	0	0
From	95.90	To	96.00	0.10	1.00	1	1
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 1 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.4' (94.5-95.9')

SPT DATA SHEET

HOLE NO. PR97-203 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 97.00 TO: 98.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	97.00	To	97.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	97.50	To	98.30	0.80	0.80	0	0
From	98.30	To	98.40	0.10	0.90	2	2
From	98.40	To	98.50	0.10	1.00	2	4
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 4 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 1.3' (97.0-98.3')

PR97-204

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 4.50 TO: 6.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	4.50	To	4.70	0.20	0.20	1	1
From	4.70	To	4.90	0.20	0.40	1	2
From	4.90	To	5.00	0.10	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	5.00	To	5.10	0.10	0.10	1	1
From	5.10	To	5.20	0.10	0.20	1	2
From	5.20	To	5.30	0.10	0.30	1	3
From	5.30	To	5.40	0.10	0.40	2	5
From	5.40	To	5.50	0.10	0.50	2	7
From	5.50	To	5.60	0.10	0.60	2	9
From	5.60	To	5.70	0.10	0.70	1	10
From	5.70	To	5.80	0.10	0.80	2	12
From	5.80	To	5.90	0.10	0.90	3	15
From	5.90	To	6.00	0.10	1.00	3	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 9.50 TO: 11.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	9.50	To	9.60	0.10	0.10	1	1
From	9.60	To	9.70	0.10	0.20	2	3
From	9.70	To	9.80	0.10	0.30	2	5
From	9.80	To	9.90	0.10	0.40	1	6
From	9.90	To	10.00	0.10	0.50	1	7

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	10.00	To	10.10	0.10	0.10	1	1
From	10.10	To	10.20	0.10	0.20	1	2
From	10.20	To	10.30	0.10	0.30	1	3
From	10.30	To	10.40	0.10	0.40	1	4
From	10.40	To	10.50	0.10	0.50	2	6
From	10.50	To	10.60	0.10	0.60	1	7
From	10.60	To	10.70	0.10	0.70	1	8
From	10.70	To	10.80	0.10	0.80	2	10
From	10.80	To	10.90	0.10	0.90	2	12
From	10.90	To	11.00	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.0 PERCENT RECOVERY 0

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material. Rock in shoe of sampler

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 14.50 TO: 16.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	14.50	To	14.70	0.20	0.20	1	1
From	14.70	To	14.80	0.10	0.30	1	2
From	14.80	To	14.90	0.10	0.40	1	3
From	14.90	To	15.00	0.10	0.50	1	4
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	15.00	To	15.10	0.10	0.10	1	1
From	15.10	To	15.20	0.10	0.20	1	2
From	15.20	To	15.30	0.10	0.30	1	3
From	15.30	To	15.40	0.10	0.40	1	4
From	15.40	To	15.50	0.10	0.50	1	5
From	15.50	To	15.60	0.10	0.60	1	6
From	15.60	To	15.70	0.10	0.70	1	7
From	15.70	To	15.80	0.10	0.80	1	8
From	15.80	To	15.90	0.10	0.90	1	9
From	15.90	To	16.00	0.10	1.00	1	10

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.9 PERCENT RECOVERY 60

TOTAL BLOWS (after seating) 10 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 19.50 TO: 21.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	19.50	To	19.60	0.10	0.10	1	1
From	19.60	To	19.70	0.10	0.20	1	2
From	19.70	To	19.80	0.10	0.30	1	3
From	19.80	To	19.90	0.10	0.40	1	4
From	19.90	To	20.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	20.00	To	20.10	0.10	0.10	1	1
From	20.10	To	20.20	0.10	0.20	2	3
From	20.20	To	20.30	0.10	0.30	2	5
From	20.30	To	20.40	0.10	0.40	1	6
From	20.40	To	20.50	0.10	0.50	2	8
From	20.50	To	20.60	0.10	0.60	2	10
From	20.60	To	20.70	0.10	0.70	2	12
From	20.70	To	20.80	0.10	0.80	2	14
From	20.80	To	20.90	0.10	0.90	3	17
From	20.90	To	21.00	0.10	1.00	2	19

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 19 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 24.50 TO: 26.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	24.50	To	24.60	0.10	0.10	1	1
From	24.60	To	24.70	0.10	0.20	1	2
From	24.70	To	24.80	0.10	0.30	1	3
From	24.80	To	24.90	0.10	0.40	1	4
From	24.90	To	25.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	25.00	To	25.10	0.10	0.10	1	1
From	25.10	To	25.20	0.10	0.20	2	3
From	25.20	To	25.30	0.10	0.30	1	4
From	25.30	To	25.40	0.10	0.40	2	6
From	25.40	To	25.50	0.10	0.50	2	8
From	25.50	To	25.60	0.10	0.60	1	9
From	25.60	To	25.70	0.10	0.70	2	11
From	25.70	To	25.80	0.10	0.80	2	13
From	25.80	To	25.90	0.10	0.90	3	16
From	25.90	To	26.00	0.10	1.00	4	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/15/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 29.50 TO: 31.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	29.50	To	29.70	0.20	0.20	1	1
From	29.70	To	29.80	0.10	0.30	1	2
From	29.80	To	29.90	0.10	0.40	1	3
From	29.90	To	30.00	0.10	0.50	1	4
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	30.00	To	30.10	0.10	0.10	1	1
From	30.10	To	30.20	0.10	0.20	2	3
From	30.20	To	30.30	0.10	0.30	2	5
From	30.30	To	30.40	0.10	0.40	2	7
From	30.40	To	30.50	0.10	0.50	2	9
From	30.50	To	30.60	0.10	0.60	2	11
From	30.60	To	30.70	0.10	0.70	2	13
From	30.70	To	30.80	0.10	0.80	3	16
From	30.80	To	30.90	0.10	0.90	3	19
From	30.90	To	31.00	0.10	1.00	2	21

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 21 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 35.50 TO: 37.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	35.50	To	35.80	0.30	0.30	0	0
From	35.80	To	35.90	0.10	0.40	1	1
From	35.90	To	36.00	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	36.00	To	36.10	0.10	0.10	1	1
From	36.10	To	36.20	0.10	0.20	1	2
From	36.20	To	36.30	0.10	0.30	1	3
From	36.30	To	36.40	0.10	0.40	1	4
From	36.40	To	36.50	0.10	0.50	1	5
From	36.50	To	36.60	0.10	0.60	1	6
From	36.60	To	36.70	0.10	0.70	1	7
From	36.70	To	36.80	0.10	0.80	1	8
From	36.80	To	36.90	0.10	0.90	1	9
From	36.90	To	37.00	0.10	1.00	1	10

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 10 EXTRAPOLATED VAL. =

Description and classification of material.	Weight of drill rods pushed sampler 0.3' (35.5-35.8')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 37.00 TO: 38.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	37.00	To	37.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	37.50	To	38.20	0.70	0.70	0	0
From	38.20	To	38.30	0.10	0.80	1	1
From	38.30	To	38.40	0.10	0.90	2	3
From	38.40	To	38.50	0.10	1.00	3	6
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 6 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.2' (37.0-38.2')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 39.50 TO: 41.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	39.50	To	39.70	0.20	0.20	0	0
From	39.70	To	39.80	0.10	0.30	1	1
From	39.80	To	39.90	0.10	0.40	2	3
From	39.90	To	40.00	0.10	0.50	2	5
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	40.00	To	40.10	0.10	0.10	2	2
From	40.10	To	40.20	0.10	0.20	2	4
From	40.20	To	40.30	0.10	0.30	2	6
From	40.30	To	40.40	0.10	0.40	3	9
From	40.40	To	40.50	0.10	0.50	2	11
From	40.50	To	40.60	0.10	0.60	2	13
From	40.60	To	40.70	0.10	0.70	3	16
From	40.70	To	40.80	0.10	0.80	2	18
From	40.80	To	40.90	0.10	0.90	3	21
From	40.90	To	41.00	0.10	1.00	4	25

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 25 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.2' (39.5-39.7')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 42.00 TO: 43.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	42.00	To	42.20	0.20	0.20	0	0
From	42.20	To	42.30	0.10	0.30	1	1
From	42.30	To	42.40	0.10	0.40	1	2
From	42.40	To	42.50	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	42.50	To	42.60	0.10	0.10	1	1
From	42.60	To	42.70	0.10	0.20	2	3
From	42.70	To	42.80	0.10	0.30	2	5
From	42.80	To	42.90	0.10	0.40	2	7
From	42.90	To	43.00	0.10	0.50	2	9
From	43.00	To	43.10	0.10	0.60	2	11
From	43.10	To	43.20	0.10	0.70	2	13
From	43.20	To	43.30	0.10	0.80	2	15
From	43.30	To	43.40	0.10	0.90	2	17
From	43.40	To	43.50	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.2' (42.0-42.2')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 44.50 TO: 46.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	44.50	To	44.70	0.20	0.20	0	0
From	44.70	To	44.80	0.10	0.30	1	1
From	44.80	To	44.90	0.10	0.40	1	2
From	44.90	To	45.00	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	45.00	To	45.10	0.10	0.10	1	1
From	45.10	To	45.20	0.10	0.20	1	2
From	45.20	To	45.30	0.10	0.30	1	3
From	45.30	To	45.40	0.10	0.40	2	5
From	45.40	To	45.50	0.10	0.50	2	7
From	45.50	To	45.60	0.10	0.60	2	9
From	45.60	To	45.70	0.10	0.70	2	11
From	45.70	To	45.80	0.10	0.80	2	13
From	45.80	To	45.90	0.10	0.90	2	15
From	45.90	To	46.00	0.10	1.00	3	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.2' (44.5-44.7')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 47.00 TO: 48.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	47.00	To	47.30	0.30	0.30	0	0
From	47.30	To	47.40	0.10	0.40	1	1
From	47.40	To	47.50	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	47.50	To	47.60	0.10	0.10	1	1
From	47.60	To	47.70	0.10	0.20	1	2
From	47.70	To	47.80	0.10	0.30	2	4
From	47.80	To	47.90	0.10	0.40	2	6
From	47.90	To	48.00	0.10	0.50	2	8
From	48.00	To	48.10	0.10	0.60	2	10
From	48.10	To	48.20	0.10	0.70	2	12
From	48.20	To	48.30	0.10	0.80	2	14
From	48.30	To	48.40	0.10	0.90	2	16
From	48.40	To	48.50	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.3' (47.0-47.3')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 49.50 TO: 51.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	49.50	To	49.70	0.20	0.20	0	0
From	49.70	To	49.80	0.10	0.30	1	1
From	49.80	To	49.90	0.10	0.40	1	2
From	49.90	To	50.00	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	50.00	To	50.10	0.10	0.10	2	2
From	50.10	To	50.20	0.10	0.20	2	4
From	50.20	To	50.30	0.10	0.30	2	6
From	50.30	To	50.40	0.10	0.40	2	8
From	50.40	To	50.50	0.10	0.50	2	10
From	50.50	To	50.60	0.10	0.60	2	12
From	50.60	To	50.70	0.10	0.70	2	14
From	50.70	To	50.80	0.10	0.80	3	17
From	50.80	To	50.90	0.10	0.90	2	19
From	50.90	To	51.00	0.10	1.00	4	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.2' (49.5-49.7')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 52.00 TO: 53.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	52.00	To	52.30	0.30	0.30	0	0
From	52.30	To	52.40	0.10	0.40	1	1
From	52.40	To	52.50	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	52.50	To	52.60	0.10	0.10	1	1
From	52.60	To	52.70	0.10	0.20	1	2
From	52.70	To	52.80	0.10	0.30	1	3
From	52.80	To	52.90	0.10	0.40	2	5
From	52.90	To	53.00	0.10	0.50	2	7
From	53.00	To	53.10	0.10	0.60	3	10
From	53.10	To	53.20	0.10	0.70	2	12
From	53.20	To	53.30	0.10	0.80	1	13
From	53.30	To	53.40	0.10	0.90	3	16
From	53.40	To	53.50	0.10	1.00	2	18

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 18 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.3' (52.0-52.3')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 54.50 TO: 56.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	54.50	To	54.70	0.20	0.20	0	0
From	54.70	To	54.80	0.10	0.30	1	1
From	54.80	To	54.90	0.10	0.40	1	2
From	54.90	To	55.00	0.10	0.50	1	3
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	55.00	To	55.10	0.10	0.10	1	1
From	55.10	To	55.20	0.10	0.20	2	3
From	55.20	To	55.30	0.10	0.30	2	5
From	55.30	To	55.40	0.10	0.40	2	7
From	55.40	To	55.50	0.10	0.50	2	9
From	55.50	To	55.60	0.10	0.60	2	11
From	55.60	To	55.70	0.10	0.70	3	14
From	55.70	To	55.80	0.10	0.80	2	16
From	55.80	To	55.90	0.10	0.90	2	18
From	55.90	To	56.00	0.10	1.00	3	21

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 21 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.2' (54.5-54.7')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 57.00 TO: 58.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	57.00	To	57.30	0.30	0.30	0	0
From	57.30	To	57.40	0.10	0.40	1	1
From	57.40	To	57.50	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	57.50	To	57.60	0.10	0.10	1	1
From	57.60	To	57.70	0.10	0.20	1	2
From	57.70	To	57.80	0.10	0.30	1	3
From	57.80	To	57.90	0.10	0.40	2	5
From	57.90	To	58.00	0.10	0.50	1	6
From	58.00	To	58.10	0.10	0.60	2	8
From	58.10	To	58.20	0.10	0.70	1	9
From	58.20	To	58.30	0.10	0.80	2	11
From	58.30	To	58.40	0.10	0.90	2	13
From	58.40	To	58.50	0.10	1.00	3	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.3' (57.0-57.3')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 59.50 TO: 61.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	59.50	To	59.80	0.30	0.30	0	0
From	59.80	To	59.90	0.10	0.40	1	1
From	59.90	To	60.00	0.10	0.50	1	2
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	60.00	To	60.10	0.10	0.10	1	1
From	60.10	To	60.20	0.10	0.20	1	2
From	60.20	To	60.30	0.10	0.30	2	4
From	60.30	To	60.40	0.10	0.40	2	6
From	60.40	To	60.50	0.10	0.50	2	8
From	60.50	To	60.60	0.10	0.60	2	10
From	60.60	To	60.70	0.10	0.70	2	12
From	60.70	To	60.80	0.10	0.80	3	15
From	60.80	To	60.90	0.10	0.90	2	17
From	60.90	To	61.00	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.7 PERCENT RECOVERY 47

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.3' (59.5-59.8')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 62.00 TO: 63.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	62.00	To	62.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	62.50	To	62.80	0.30	0.30	0	0
From	62.80	To	62.90	0.10	0.40	1	1
From	62.90	To	63.00	0.10	0.50	2	3
From	63.00	To	63.10	0.10	0.60	1	4
From	63.10	To	63.20	0.10	0.70	1	5
From	63.20	To	63.30	0.10	0.80	2	7
From	63.30	To	63.40	0.10	0.90	2	9
From	63.40	To	63.50	0.10	1.00	2	11
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 11 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.8' (62.0-62.8')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 64.50 TO: 66.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	64.50	To	65.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	65.00	To	65.10	0.10	0.10	1	1
From	65.10	To	65.20	0.10	0.20	2	3
From	65.20	To	65.30	0.10	0.30	1	4
From	65.30	To	65.40	0.10	0.40	1	5
From	65.40	To	65.50	0.10	0.50	2	7
From	65.50	To	65.60	0.10	0.60	1	8
From	65.60	To	65.70	0.10	0.70	2	10
From	65.70	To	65.80	0.10	0.80	2	12
From	65.80	To	65.90	0.10	0.90	2	14
From	65.90	To	66.00	0.10	1.00	2	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.5' (64.5-65.0')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 67.00 TO: 68.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	67.00	To	67.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	67.50	To	67.60	0.10	0.10	1	1
From	67.60	To	67.70	0.10	0.20	1	2
From	67.70	To	67.80	0.10	0.30	2	4
From	67.80	To	67.90	0.10	0.40	1	5
From	67.90	To	68.00	0.10	0.50	2	7
From	68.00	To	68.10	0.10	0.60	1	8
From	68.10	To	68.20	0.10	0.70	2	10
From	68.20	To	68.30	0.10	0.80	2	12
From	68.30	To	68.40	0.10	0.90	2	14
From	68.40	To	68.50	0.10	1.00	2	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.5' (67.0-67.5')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 69.50 TO: 71.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	69.50	To	70.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	70.00	To	70.10	0.10	0.10	0	0
From	70.10	To	70.20	0.10	0.20	1	1
From	70.20	To	70.30	0.10	0.30	1	2
From	70.30	To	70.40	0.10	0.40	1	3
From	70.40	To	70.50	0.10	0.50	1	4
From	70.50	To	70.60	0.10	0.60	2	6
From	70.60	To	70.70	0.10	0.70	2	8
From	70.70	To	70.80	0.10	0.80	2	10
From	70.80	To	70.90	0.10	0.90	2	12
From	70.90	To	71.00	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.9 PERCENT RECOVERY 60

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (69.5-70.1')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 72.00 TO: 73.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	72.00	To	72.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	72.50	To	72.60	0.10	0.10	1	1
From	72.60	To	72.70	0.10	0.20	1	2
From	72.70	To	72.80	0.10	0.30	1	3
From	72.80	To	72.90	0.10	0.40	1	4
From	72.90	To	73.00	0.10	0.50	2	6
From	73.00	To	73.10	0.10	0.60	1	7
From	73.10	To	73.20	0.10	0.70	1	8
From	73.20	To	73.30	0.10	0.80	2	10
From	73.30	To	73.40	0.10	0.90	2	12
From	73.40	To	73.50	0.10	1.00	2	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.5' (72.0-72.5')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/17/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 74.50 TO: 76.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	74.50	To	75.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	75.00	To	75.10	0.10	0.10	0	0
From	75.10	To	75.20	0.10	0.20	1	1
From	75.20	To	75.30	0.10	0.30	1	2
From	75.30	To	75.40	0.10	0.40	1	3
From	75.40	To	75.50	0.10	0.50	1	4
From	75.50	To	75.60	0.10	0.60	2	6
From	75.60	To	75.70	0.10	0.70	1	7
From	75.70	To	75.80	0.10	0.80	1	8
From	75.80	To	75.90	0.10	0.90	1	9
From	75.90	To	76.00	0.10	1.00	1	10

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 10 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.6' (74.5-75.1')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 77.00 TO: 78.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	77.00	To	77.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	77.50	To	78.40	0.90	0.90	0	0
From	78.40	To	78.50	0.10	1.00	1	1
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 1 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 1.4' (77.0-78.4')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 79.50 TO: 81.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	79.50	To	80.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	80.00	To	80.10	0.10	0.10	1	1
From	80.10	To	80.20	0.10	0.20	1	2
From	80.20	To	80.30	0.10	0.30	1	3
From	80.30	To	80.40	0.10	0.40	1	4
From	80.40	To	80.50	0.10	0.50	2	6
From	80.50	To	80.60	0.10	0.60	1	7
From	80.60	To	80.70	0.10	0.70	1	8
From	80.70	To	80.80	0.10	0.80	1	9
From	80.80	To	80.90	0.10	0.90	2	11
From	80.90	To	81.00	0.10	1.00	3	14

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 14 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.5' (79.5-80.0')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 82.00 TO: 83.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	82.00	To	82.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	82.50	To	82.70	0.20	0.20	0	0
From	82.70	To	82.80	0.10	0.30	1	1
From	82.80	To	82.90	0.10	0.40	1	2
From	82.90	To	83.00	0.10	0.50	2	4
From	83.00	To	83.10	0.10	0.60	1	5
From	83.10	To	83.20	0.10	0.70	2	7
From	83.20	To	83.30	0.10	0.80	2	9
From	83.30	To	83.40	0.10	0.90	2	11
From	83.40	To	83.50	0.10	1.00	2	13
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.7' (82.0-82.7')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 84.50 TO: 86.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	84.50	To	85.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	85.00	To	85.10	0.10	0.10	1	1
From	85.10	To	85.20	0.10	0.20	1	2
From	85.20	To	85.30	0.10	0.30	1	3
From	85.30	To	85.40	0.10	0.40	1	4
From	85.40	To	85.50	0.10	0.50	2	6
From	85.50	To	85.60	0.10	0.60	2	8
From	85.60	To	85.70	0.10	0.70	2	10
From	85.70	To	85.80	0.10	0.80	2	12
From	85.80	To	85.90	0.10	0.90	2	14
From	85.90	To	86.00	0.10	1.00	3	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.5' (84.5-85.0')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 87.00 TO: 88.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	87.00	To	87.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	87.50	To	87.80	0.30	0.30	0	0
From	87.80	To	87.90	0.10	0.40	1	1
From	87.90	To	88.00	0.10	0.50	2	3
From	88.00	To	88.10	0.10	0.60	1	4
From	88.10	To	88.20	0.10	0.70	2	6
From	88.20	To	88.30	0.10	0.80	1	7
From	88.30	To	88.40	0.10	0.90	2	9
From	88.40	To	88.50	0.10	1.00	3	12
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.8' (87.0-87.8')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 89.50 TO: 91.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	89.50	To	90.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	90.00	To	90.40	0.40	0.40	0	0
From	90.40	To	90.50	0.10	0.50	2	2
From	90.50	To	90.60	0.10	0.60	1	3
From	90.60	To	90.70	0.10	0.70	2	5
From	90.70	To	90.80	0.10	0.80	1	6
From	90.80	To	90.90	0.10	0.90	2	8
From	90.90	To	91.00	0.10	1.00	3	11
From		To					
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 11 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.9' (89.5-90.4')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 92.00 TO: 93.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	92.00	To	92.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	92.50	To	92.80	0.30	0.30	0	0
From	92.80	To	92.90	0.10	0.40	2	2
From	92.90	To	93.00	0.10	0.50	1	3
From	93.00	To	93.10	0.10	0.60	2	5
From	93.10	To	93.20	0.10	0.70	1	6
From	93.20	To	93.30	0.10	0.80	2	8
From	93.30	To	93.40	0.10	0.90	2	10
From	93.40	To	93.50	0.10	1.00	2	12
From		To					
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 12 EXTRAPOLATED VAL. =

Description and classification of material.

Weight of drill rods pushed sampler 0.8' (92.0-92.8')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 94.50 TO: 96.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	94.50	To	95.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	95.00	To	95.10	0.10	0.10	1	1
From	95.10	To	95.20	0.10	0.20	1	2
From	95.20	To	95.30	0.10	0.30	1	3
From	95.30	To	95.40	0.10	0.40	1	4
From	95.40	To	95.50	0.10	0.50	2	6
From	95.50	To	95.60	0.10	0.60	1	7
From	95.60	To	95.70	0.10	0.70	2	9
From	95.70	To	95.80	0.10	0.80	1	10
From	95.80	To	95.90	0.10	0.90	2	12
From	95.90	To	96.00	0.10	1.00	3	15

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 15 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.5' (94.5-95.0')

SPT DATA SHEET

HOLE NO. PR97-204 **DATE** 05/18/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 97.00 TO: 98.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	97.00	To	97.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	97.50	To	97.70	0.20	0.20	0	0
From	97.70	To	97.80	0.10	0.30	1	1
From	97.80	To	97.90	0.10	0.40	1	2
From	97.90	To	98.00	0.10	0.50	1	3
From	98.00	To	98.10	0.10	0.60	1	4
From	98.10	To	98.20	0.10	0.70	1	5
From	98.20	To	98.30	0.10	0.80	1	6
From	98.30	To	98.40	0.10	0.90	1	7
From	98.40	To	98.50	0.10	1.00	1	8
From		To					

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 8 EXTRAPOLATED VAL. =

Description and classification of material. Weight of drill rods pushed sampler 0.7' (97.0-97.7')

PR97-205

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 4.50 TO: 6.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	4.50	To	4.60	0.10	0.10	1	1
From	4.60	To	4.70	0.10	0.20	1	2
From	4.70	To	4.80	0.10	0.30	2	4
From	4.80	To	4.90	0.10	0.40	1	5
From	4.90	To	5.00	0.10	0.50	1	6

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	5.00	To	5.10	0.10	0.10	1	1
From	5.10	To	5.20	0.10	0.20	1	2
From	5.20	To	5.30	0.10	0.30	1	3
From	5.30	To	5.40	0.10	0.40	1	4
From	5.40	To	5.50	0.10	0.50	1	5
From	5.50	To	5.60	0.10	0.60	1	6
From	5.60	To	5.70	0.10	0.70	2	8
From	5.70	To	5.80	0.10	0.80	1	9
From	5.80	To	5.90	0.10	0.90	2	11
From	5.90	To	6.00	0.10	1.00	2	13

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 13 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 9.50 TO: 11.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	9.50	To	9.60	0.10	0.10	1	1
From	9.60	To	9.70	0.10	0.20	1	2
From	9.70	To	9.80	0.10	0.30	1	3
From	9.80	To	9.90	0.10	0.40	1	4
From	9.90	To	10.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	10.00	To	10.10	0.10	0.10	1	1
From	10.10	To	10.20	0.10	0.20	2	3
From	10.20	To	10.30	0.10	0.30	1	4
From	10.30	To	10.40	0.10	0.40	2	6
From	10.40	To	10.50	0.10	0.50	1	7
From	10.50	To	10.60	0.10	0.60	2	9
From	10.60	To	10.70	0.10	0.70	2	11
From	10.70	To	10.80	0.10	0.80	1	12
From	10.80	To	10.90	0.10	0.90	3	15
From	10.90	To	11.00	0.10	1.00	2	17

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 17 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 14.50 TO: 16.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	14.50	To	14.60	0.10	0.10	1	1
From	14.60	To	14.70	0.10	0.20	1	2
From	14.70	To	14.80	0.10	0.30	1	3
From	14.80	To	14.90	0.10	0.40	1	4
From	14.90	To	15.00	0.10	0.50	1	5

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	15.00	To	15.10	0.10	0.10	1	1
From	15.10	To	15.20	0.10	0.20	1	2
From	15.20	To	15.30	0.10	0.30	2	4
From	15.30	To	15.40	0.10	0.40	2	6
From	15.40	To	15.50	0.10	0.50	2	8
From	15.50	To	15.60	0.10	0.60	1	9
From	15.60	To	15.70	0.10	0.70	2	11
From	15.70	To	15.80	0.10	0.80	2	13
From	15.80	To	15.90	0.10	0.90	3	16
From	15.90	To	16.00	0.10	1.00	3	19

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 19 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 19.50 TO: 21.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	19.50	To	19.60	0.10	0.10	1	1
From	19.60	To	19.70	0.10	0.20	1	2
From	19.70	To	19.80	0.10	0.30	2	4
From	19.80	To	19.90	0.10	0.40	2	6
From	19.90	To	20.00	0.10	0.50	4	10

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	20.00	To	20.10	0.10	0.10	3	3
From	20.10	To	20.20	0.10	0.20	2	5
From	20.20	To	20.30	0.10	0.30	4	9
From	20.30	To	20.40	0.10	0.40	3	12
From	20.40	To	20.50	0.10	0.50	3	15
From	20.50	To	20.60	0.10	0.60	3	18
From	20.60	To	20.70	0.10	0.70	3	21
From	20.70	To	20.80	0.10	0.80	3	24
From	20.80	To	20.90	0.10	0.90	5	29
From	20.90	To	21.00	0.10	1.00	5	34

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.6 PERCENT RECOVERY 40

TOTAL BLOWS (after seating) 34 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 22.00 TO: 23.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	22.00	To	22.10	0.10	0.10	1	1
From	22.10	To	22.20	0.10	0.20	1	2
From	22.20	To	22.30	0.10	0.30	2	4
From	22.30	To	22.40	0.10	0.40	2	6
From	22.40	To	22.50	0.10	0.50	3	9

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	22.50	To	22.60	0.10	0.10	2	2
From	22.60	To	22.70	0.10	0.20	3	5
From	22.70	To	22.80	0.10	0.30	2	7
From	22.80	To	22.90	0.10	0.40	3	10
From	22.90	To	23.00	0.10	0.50	3	13
From	23.00	To	23.10	0.10	0.60	2	15
From	23.10	To	23.20	0.10	0.70	4	19
From	23.20	To	23.30	0.10	0.80	2	21
From	23.30	To	23.40	0.10	0.90	4	25
From	23.40	To	23.50	0.10	1.00	4	29

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 0.8 PERCENT RECOVERY 53

TOTAL BLOWS (after seating) 29 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 24.50 TO: 26.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	24.50	To	24.60	0.10	0.10	1	1
From	24.60	To	24.70	0.10	0.20	1	2
From	24.70	To	24.80	0.10	0.30	2	4
From	24.80	To	24.90	0.10	0.40	3	7
From	24.90	To	25.00	0.10	0.50	2	9

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	25.00	To	25.10	0.10	0.10	2	2
From	25.10	To	25.20	0.10	0.20	3	5
From	25.20	To	25.30	0.10	0.30	2	7
From	25.30	To	25.40	0.10	0.40	4	11
From	25.40	To	25.50	0.10	0.50	2	13
From	25.50	To	25.60	0.10	0.60	3	16
From	25.60	To	25.70	0.10	0.70	3	19
From	25.70	To	25.80	0.10	0.80	3	22
From	25.80	To	25.90	0.10	0.90	4	26
From	25.90	To	26.00	0.10	1.00	4	30

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.0 PERCENT RECOVERY 67

TOTAL BLOWS (after seating) 30 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 27.00 TO: 28.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	27.00	To	27.10	0.10	0.10	1	1
From	27.10	To	27.20	0.10	0.20	1	2
From	27.20	To	27.30	0.10	0.30	2	4
From	27.30	To	27.40	0.10	0.40	2	6
From	27.40	To	27.50	0.10	0.50	2	8

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	27.50	To	27.60	0.10	0.10	2	2
From	27.60	To	27.70	0.10	0.20	2	4
From	27.70	To	27.80	0.10	0.30	2	6
From	27.80	To	27.90	0.10	0.40	3	9
From	27.90	To	28.00	0.10	0.50	2	11
From	28.00	To	28.10	0.10	0.60	3	14
From	28.10	To	28.20	0.10	0.70	2	16
From	28.20	To	28.30	0.10	0.80	3	19
From	28.30	To	28.40	0.10	0.90	3	22
From	28.40	To	28.50	0.10	1.00	3	25

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.1 PERCENT RECOVERY 73

TOTAL BLOWS (after seating) 25 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 29.50 TO: 31.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	29.50	To	29.60	0.10	0.10	10	10
From	29.60	To	29.70	0.10	0.20	10	20
From	29.70	To	29.80	0.10	0.30	10	30
From	29.80	To	29.90	0.10	0.40	3	33
From	29.90	To	30.00	0.10	0.50	3	36

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	30.00	To	30.10	0.10	0.10	2	2
From	30.10	To	30.20	0.10	0.20	2	4
From	30.20	To	30.30	0.10	0.30	3	7
From	30.30	To	30.40	0.10	0.40	3	10
From	30.40	To	30.50	0.10	0.50	3	13
From	30.50	To	30.60	0.10	0.60	2	15
From	30.60	To	30.70	0.10	0.70	3	18
From	30.70	To	30.80	0.10	0.80	2	20
From	30.80	To	30.90	0.10	0.90	4	24
From	30.90	To	31.00	0.10	1.00	3	27

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 27 EXTRAPOLATED VAL. =

Description and classification of material. Rock in front of barrel - bent

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 32.00 TO: 33.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	32.00	To	32.30	0.30	0.30	1	1
From	32.30	To	32.40	0.10	0.40	1	2
From	32.40	To	32.50	0.10	0.50	1	3
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	32.50	To	32.60	0.10	0.10	1	1
From	32.60	To	32.70	0.10	0.20	2	3
From	32.70	To	32.80	0.10	0.30	2	5
From	32.80	To	32.90	0.10	0.40	2	7
From	32.90	To	33.00	0.10	0.50	3	10
From	33.00	To	33.10	0.10	0.60	2	12
From	33.10	To	33.20	0.10	0.70	3	15
From	33.20	To	33.30	0.10	0.80	2	17
From	33.30	To	33.40	0.10	0.90	3	20
From	33.40	To	33.50	0.10	1.00	3	23

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 23 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 34.50 TO: 36.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	34.50	To	34.90	0.40	0.40	1	1
From	34.90	To	35.00	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	35.00	To	35.10	0.10	0.10	1	1
From	35.10	To	35.20	0.10	0.20	1	2
From	35.20	To	35.30	0.10	0.30	2	4
From	35.30	To	35.40	0.10	0.40	2	6
From	35.40	To	35.50	0.10	0.50	2	8
From	35.50	To	35.60	0.10	0.60	2	10
From	35.60	To	35.70	0.10	0.70	3	13
From	35.70	To	35.80	0.10	0.80	3	16
From	35.80	To	35.90	0.10	0.90	3	19
From	35.90	To	36.00	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 37.00 TO: 38.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	37.00	To	37.40	0.40	0.40	1	1
From	37.40	To	37.50	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	37.50	To	37.60	0.10	0.10	1	1
From	37.60	To	37.70	0.10	0.20	2	3
From	37.70	To	37.80	0.10	0.30	2	5
From	37.80	To	37.90	0.10	0.40	2	7
From	37.90	To	38.00	0.10	0.50	2	9
From	38.00	To	38.10	0.10	0.60	3	12
From	38.10	To	38.20	0.10	0.70	3	15
From	38.20	To	38.30	0.10	0.80	3	18
From	38.30	To	38.40	0.10	0.90	3	21
From	38.40	To	38.50	0.10	1.00	4	25

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.4 PERCENT RECOVERY 93

TOTAL BLOWS (after seating) 25 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 39.50 TO: 41.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	39.50	To	39.90	0.40	0.40	1	1
From	39.90	To	40.00	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	40.00	To	40.10	0.10	0.10	1	1
From	40.10	To	40.20	0.10	0.20	1	2
From	40.20	To	40.30	0.10	0.30	1	3
From	40.30	To	40.40	0.10	0.40	2	5
From	40.40	To	40.50	0.10	0.50	2	7
From	40.50	To	40.60	0.10	0.60	2	9
From	40.60	To	40.70	0.10	0.70	2	11
From	40.70	To	40.80	0.10	0.80	3	14
From	40.80	To	40.90	0.10	0.90	3	17
From	40.90	To	41.00	0.10	1.00	3	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.3 PERCENT RECOVERY 87

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 42.00 TO: 43.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	42.00	To	42.40	0.40	0.40	1	1
From	42.40	To	42.50	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	42.50	To	42.60	0.10	0.10	1	1
From	42.60	To	42.70	0.10	0.20	2	3
From	42.70	To	42.80	0.10	0.30	1	4
From	42.80	To	42.90	0.10	0.40	2	6
From	42.90	To	43.00	0.10	0.50	2	8
From	43.00	To	43.10	0.10	0.60	3	11
From	43.10	To	43.20	0.10	0.70	2	13
From	43.20	To	43.30	0.10	0.80	3	16
From	43.30	To	43.40	0.10	0.90	3	19
From	43.40	To	43.50	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 44.50 TO: 46.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	44.50	To	45.00	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	45.00	To	45.10	0.10	0.10	1	1
From	45.10	To	45.20	0.10	0.20	1	2
From	45.20	To	45.30	0.10	0.30	1	3
From	45.30	To	45.40	0.10	0.40	3	6
From	45.40	To	45.50	0.10	0.50	1	7
From	45.50	To	45.60	0.10	0.60	1	8
From	45.60	To	45.70	0.10	0.70	1	9
From	45.70	To	45.80	0.10	0.80	1	10
From	45.80	To	45.90	0.10	0.90	3	13
From	45.90	To	46.00	0.10	1.00	3	16

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.1 PERCENT RECOVERY 73

TOTAL BLOWS (after seating) 16 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 47.00 TO: 48.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	47.00	To	47.40	0.40	0.40	1	1
From	47.40	To	47.50	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	47.50	To	47.60	0.10	0.10	1	1
From	47.60	To	47.70	0.10	0.20	2	3
From	47.70	To	47.80	0.10	0.30	1	4
From	47.80	To	47.90	0.10	0.40	3	7
From	47.90	To	48.00	0.10	0.50	2	9
From	48.00	To	48.10	0.10	0.60	2	11
From	48.10	To	48.20	0.10	0.70	2	13
From	48.20	To	48.30	0.10	0.80	2	15
From	48.30	To	48.40	0.10	0.90	4	19
From	48.40	To	48.50	0.10	1.00	3	22

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 22 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 49.50 TO: 51.00

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	49.50	To	49.90	0.40	0.40	1	1
From	49.90	To	50.00	0.10	0.50	1	2
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	50.00	To	50.10	0.10	0.10	1	1
From	50.10	To	50.20	0.10	0.20	1	2
From	50.20	To	50.30	0.10	0.30	2	4
From	50.30	To	50.40	0.10	0.40	2	6
From	50.40	To	50.50	0.10	0.50	2	8
From	50.50	To	50.60	0.10	0.60	2	10
From	50.60	To	50.70	0.10	0.70	2	12
From	50.70	To	50.80	0.10	0.80	2	14
From	50.80	To	50.90	0.10	0.90	3	17
From	50.90	To	51.00	0.10	1.00	2	19

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.5 PERCENT RECOVERY 100

TOTAL BLOWS (after seating) 19 EXTRAPOLATED VAL. =

Description and classification of material.

SPT DATA SHEET

HOLE NO. PR97-205 **DATE** 05/19/97 **DRILLER** Mike McNamee

LOCATION

FEATURE Anita Dam **PROJECT** BLM

STATE Montana

TEST DEPTH FROM: 53.00 TO: 54.50

SEATING PENETRATION

Depth				Penetration *	Sum of Penetration (0 to 0.5')	No. Blows	Sum of Blows (50 max.)
From	53.00	To	53.50	0.50	0.50	0	0
From		To					
From		To					
From		To					
From		To					

TEST PENETRATION

Depth				Penetration *	Sum of Penetration (0.5 to 1.5')	No. Blows	Sum of Blows (50 max.)
From	53.50	To	53.60	0.10	0.10	1	1
From	53.60	To	53.70	0.10	0.20	1	2
From	53.70	To	53.80	0.10	0.30	1	3
From	53.80	To	53.90	0.10	0.40	2	5
From	53.90	To	54.00	0.10	0.50	4	9
From	54.00	To	54.10	0.10	0.60	2	11
From	54.10	To	54.20	0.10	0.70	2	13
From	54.20	To	54.30	0.10	0.80	2	15
From	54.30	To	54.40	0.10	0.90	3	18
From	54.40	To	54.50	0.10	1.00	2	20

* Attempt to penetrate only 0.1-ft. and record number of blows needed. If in soft zone which exceeds 0.1-ft. per blow, record penetration resulting from one blow.

TOTAL PENETRATION 1.50 TOTAL RECOVERY 1.2 PERCENT RECOVERY 80

TOTAL BLOWS (after seating) 20 EXTRAPOLATED VAL. =

Description and classification of material.

SPT SUMMARY TABLE

ANITA DAM
Standard Penetration Testing Summary

Drill Hole Number	Test Interval (ft)	Blows/Foot (N)	Moisture Content (%)
PR97-201	5.5-6.5	17	17.0
"	10.5-11.5	18	15.3
"	15.5-16.5	18	15.4
"	35.5-36.5	15	16.3
"	40.0-41.0	17	18.5
"	42.5-43.5	17	18.8
"	45.0-46.0	20	18.7
"	48.5-49.5	17	18.1
"	51.0-52.0	18	18.4
"	53.5-54.5	13	17.8
"	56.0-57.0	0	--
"	58.5-59.5	2	--
"	62.5-63.5	5	16.1
"	80.5-81.5	0	17.4
"	83.0-84.0	2	17.2
"	85.5-86.5	5	17.1
"	88.0-89.0	0	17.0
"	90.5-91.5	0	18.4
"	93.0-94.0	3	16.5
"	95.5-96.5	4	18.4
"	98.0-99.0	0	16.9
PR97-202	5.0-6.0	12	16.4
"	10.0-11.0	15	15.5
"	15.0-16.0	22	13.5
"	20.0-21.0	12	14.2
"	25.0-26.0	16	15.3
"	30.0-31.0	22	11.7
"	32.5-33.5	12	15.1
"	35.0-36.0	21	18.3
"	37.5-38.5	21	16.2
"	40.0-41.0	23	15.6
"	42.5-43.5	24	16.4
"	45.0-46.0	23	15.5
"	47.5-48.5	19	15.5
"	50.0-51.0	23	14.8
"	52.5-53.5	22	15.4
"	55.0-56.0	24	17.5
"	57.5-58.5	23	18.5
"	60.0-61.0	16	17.7
"	62.5-63.5	34	17.1
"	65.0-66.0	23	17.2
"	67.5-68.5	22	14.7
"	70.0-71.0	21	16.1

ANITA DAM
Standard Penetration Testing Summary

Drill Hole Number	Test Interval (ft)	Blows/Foot (N)	Moisture Content (%)
PR97-203	5.0-6.0	11	12.5
"	10.0-11.0	14	14.0
"	15.0-16.0	14	14.5
"	20.0-21.0	15	12.3
"	25.0-26.0	14	15.3
"	30.0-31.0	13	13.3
"	35.0-36.0	18	13.2
"	40.0-41.0	20	13.8
"	45.0-46.0	15	11.8
"	47.5-48.5	13	19.3
"	50.0-51.0	17	16.2
"	52.5-53.5	13	16.3
"	55.0-56.0	20	17.6
"	57.5-58.5	13	18.0
"	60.0-61.0	15	19.4
"	62.5-63.5	16	19.3
"	65.0-66.0	8	19.1
"	67.5-68.5	11	17.8
"	70.0-71.0	5	18.6
"	72.5-73.5	28	17.5
"	75.0-76.0	6	18.7
"	77.5-78.5	14	18.8
"	80.0-81.0	16	18.0
"	82.5-83.5	13	18.4
"	85.0-86.0	12	18.9
"	87.5-88.5	14	18.5
"	90.0-91.0	10	18.9
"	92.5-93.5	10	18.0
"	95.0-96.0	1	18.6
"	97.5-98.5	4	17.4
PR97-204	5.0-6.0	18	14.3
"	10.0-11.0	14	--
"	15.0-16.0	10	16.3
"	20.0-21.0	19	15.5
"	25.0-26.0	20	17.0
"	30.0-31.0	21	16.1
"	36.0-37.0	10	17.6
"	37.5-38.5	6	19.1
"	40.0-41.0	25	10.4
"	42.5-43.5	20	16.2
"	45.0-46.0	18	16.3
"	47.5-48.5	18	16.0
"	50.0-51.0	23	16.9
"	52.5-53.5	18	17.2
"	55.0-56.0	21	16.9

ANITA DAM
Standard Penetration Testing Summary

Drill Hole Number	Test Interval (ft)	Blows/Foot (N)	Moisture Content (%)
PR97-204 (cont)	57.5-58.5	16	18.4
"	60.0-61.0	20	17.6
"	62.5-63.5	11	17.5
"	65.0-66.0	16	19.2
"	67.5-68.5	16	17.6
"	70.0-71.0	14	16.2
"	72.5-73.5	14	17.6
"	75.0-76.0	10	18.3
"	77.5-78.5	1	18.6
"	80.0-81.0	14	16.8
"	82.5-83.5	13	16.1
"	85.0-86.0	17	16.2
"	87.5-88.5	12	16.0
"	90.0-91.0	11	15.7
"	92.5-93.5	12	15.8
"	95.0-96.0	15	15.8
"	97.5-98.5	8	16.1
PR97-205	5.0-6.0	13	13.7
"	10.0-11.0	17	13.5
"	15.0-16.0	19	13.9
"	20.0-21.0	34	8.7
"	22.5-23.5	29	11.9
"	25.0-26.0	30	12.3
"	27.5-28.5	25	13.4
"	30.0-31.0	27	13.1
"	32.5-33.5	23	12.9
"	35.0-36.0	22	14.8
"	37.5-38.5	25	14.7
"	40.0-41.0	20	14.6
"	42.5-43.5	22	14.6
"	45.0-46.0	16	13.8
"	47.5-48.5	22	15.1
"	50.0-51.0	19	15.3
"	53.5-54.5	20	13.8

APPENDIX D
LABORATORY TEST RESULTS

MSE - HKM, Inc.
2727 Central Avenue
P.O. Box 31318
Billings, MT 59107-1318
(406) 656-6399
FAX (406) 656-6398

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JUN 24 '97

REPLY DATE		
INFO. COPY TO:		
DATE	INITIAL	TO
		2306
CLASSIFICATION		
PROJECT		
CONTROL NO.		
FOLDER I.D.		

June 23, 1997
F:WP\11M145115JAR07401.DOC

Mr. Lovell Parish
U.S. Bureau of Reclamation
P.O. Box 36900
Billings, MT 59107-6900

RE: Anita Dam Materials Testing (Call #7)

Dear Lovell:

Enclosed are the results of tests performed on the one hundred thirty-four (134) soil samples that were delivered to our lab on June 4, 1997.

Should you have any questions or comments, please contact us at your convenience.

Sincerely,

MSE-HKM, INC.

Randy Fincher
Lab Manager

RF/jar

Enclosures

NOTICE:
IF YOU DETACH ENCLOSURES, PLEASE
INSERT YOUR CODE NUMBER _____

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 1 of 7

Project: BLM Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200/0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11859	97-201	5.0 - 6.5																17.0		
11860	97-201	6.5 - 7.5 PINHOLE #1																15.5		
11861	97-201	6.5 - 7.5 PINHOLE #2																15.2		
11862	97-201	10.0 - 11.5																15.3		
11863	97-201	15.0 - 16.5	CL	82.6		17.4	0.0			45	33							15.4		
11864	97-201	16.5 - 18.5 PINHOLE #1																17.8		
11865	97-201	16.5 - 18.5 PINHOLE #2																15.3		
11866	97-201	35.0 - 36.5																16.3		
11867	97-201	39.5 - 41.0																18.5		
11868	97-201	42.0 - 43.5																18.8		
11869	97-201	44.5 - 46.0																18.7		
11870	97-201	48.0 - 49.5																18.1		
11871	97-201	50.5 - 52.0	CL	74.0		26.0	0.0			39	27							18.4		
11872	97-201	53.0 - 54.5																17.6		
11873	97-201	62.2 - 64.4																16.1		
11874	97-201	66.5 - 67.0 AUGER																16.8		
11875	97-201	72.0 - 73.0 PINHOLE #1																18.1		
11876	97-201	72.0 - 73.0 PINHOLE #2																18.1		
11877	97-201	70.0 - 75.3																17.3		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 2 of 7

Project: BLM

Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY		
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200(0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11879	97-201	80.0 - 82.5 3" SAMPLER																17.0		
11879	97-201	92.5 - 95.0 3" SAMPLER																17.2		
11880	97-201	85.0 - 87.5 3" SAMPLER																17.1		
11880	97-201	87.5 - 90.0 3" SAMPLER																17.0		
11882	97-201	90.0 - 92.5 3" SAMPLER																18.4		
11883	97-201	92.5 - 95.0 3" SAMPLER																16.5		
11884	97-201	95.0 - 95.5 3" SAMPLER																18.4		
11885	97-201	97.5 - 100.0 3" SAMPLER																16.9		
11886	97-202	4.5 - 6.0																16.4		
11887	97-202	9.5 - 11.0																15.5		
11886	97-202	14.5 - 16.0																13.5		
11889	97-202	19.5 - 21.0																14.2		
11892	97-202	19.0 - 24.5 3" SAMPLER																14.9		
11893	97-202	24.5 - 26.0																15.3		
11894	97-202	29.5 - 31.0																11.7		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 3 of 7

Project: BLM

Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200/0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11895	97-202	31.0 - 32.0 3" SAMPLER																5.6		
11896	97-202	32.0 - 33.5	CL	67.4		32.1	0.5	0.0		41	29							15.1		
11897	97-202	34.5 - 36.0																18.3		
11898	97-202	37.0 - 38.5																16.2		
11899	97-202	39.5 - 41.0																15.6		
11900	97-202	42.0 - 43.5	CL	77.4		21.8	0.8	0.0		39	28							16.4		
11901	97-202	44.5 - 46.0																15.5		
11902	97-202	47.0 - 48.5																15.5		
11903	97-202	49.5 - 51.0																14.8		
11904	97-202	52.0 - 53.5																15.4		
11905	97-202	54.5 - 56.0																17.5		
11906	97-202	57.0 - 58.5																18.5		
11907	97-202	59.5 - 61.0																17.7		
11908	97-202	62.0 - 63.5																17.1		
11909	97-202	64.5 - 66.0																17.2		
11910	97-202	67.0 - 68.5																14.7		
11911	97-202	69.5 - 71.0																16.1		
11912	97-202	72.0 - 73.5																16.2		
11913	97-203	4.5 - 6.0																12.5		
11914	97-203	9.5 - 11.0																14.0		
11915	97-203	14.5 - 16.0																14.5		
11916	97-203	19.5 - 21.0																12.3		
11917	97-203	24.5 - 26.0	CL	79.3		19.3	1.4	0.0		45	31							15.3		
11918	97-203	29.5 - 31.0																13.3		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 4 of 7

Project: BLM

Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200(0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11919	97-203	34.5 - 36.0																13.2		
11920	97-203	39.5 - 41.0																13.8		
11921	97-203	44.5 - 46.0																11.8		
11922	97-203	47.0 - 48.5																19.3		
11923	97-203	49.5 - 51.0																16.2		
11924	97-203	52.0 - 53.5																19.3		
11925	97-203	54.5 - 56.0																17.6		
11926	97-203	56.0 - 57.0 Pinhole #1																17.7		
11927	97-203	56.0 - 57.9 Pinhole #2																16.9		
11928	97-203	57.0 - 58.5																18.0		
11929	97-203	59.5 - 61.0																19.4		
11930	97-203	62.0 - 63.5																19.3		
11931	97-203	64.5 - 66.0																19.1		
11932	97-203	67.0 - 68.5	CL	74.6		25.4	0.0			43	31							17.8		
11933	97-203	69.5 - 71.0																18.6		
11934	97-203	72.0 - 73.5																17.5		
11935	97-203	74.5 - 76.0																18.7		
11936	97-203	77.0 - 78.5																18.8		
11937	97-203	79.5 - 81.0																18.0		
11938	97-203	82.0 - 83.5																18.4		
11939	97-203	84.5 - 86.0																18.9		
11940	97-203	87.0 - 88.5																18.5		
11941	97-203	89.5 - 91.0																18.9		
11942	97-203	92.0 - 93.5																18.0		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 5 of 7

Project: BLM Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200/0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11943	97-203	94.5 - 96.0																18.6		
11944	97-203	97.0 - 98.5																17.4		
11945	97-204	4.5 - 6.0																14.3		
11946	97-204	14.5 - 16.0																16.3		
11947	97-204	19.5 - 21.0																15.5		
11948	97-204	24.5 - 26.0																17.0		
11949	97-204	29.5 - 31.0																16.1		
11950	97-204	35.5 - 37.0																17.0		
11951	97-204	37.0 - 38.5																19.1		
11952	97-204	39.5 - 41.0	CL	76.6		23.4	0.0			40	28							10.4		
11953	97-204	41.0 CLEANOUT																13.4		
11954	97-204	42.0 - 43.5																16.2		
11955	97-204	44.5 - 46.0																16.3		
11956	97-204	47.0 - 48.5																16.0		
11957	97-204	49.5 - 51.0																16.9		
11958	97-204	52.0 - 53.5																17.2		
11959	97-204	54.5 - 56.0																16.9		
11960	97-204	57.0 - 58.5																16.4		
11961	97-204	59.5 - 61.0																17.0		
11962	97-204	62.0 - 63.5																17.5		
11963	97-204	64.5 - 66.0																19.2		
11964	97-204	67.0 - 68.5																17.6		
11965	97-204	69.5 - 71.0	CL	70.7		28.4	0.9	0.0		37	26							16.2		
11966	97-204	72.0 - 73.5																17.6		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

Table: 7
Sheet 6 of 7

Project: BLM Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200(0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11967	97-204	74.5 - 76.0																18.3		
11969	97-204	77.0 - 78.5																18.6		
11969	97-204	79.5 - 81.0																16.8		
11970	97-204	82.0 - 83.5																16.1		
11971	97-204	84.5 - 86.0																16.2		
11972	97-204	87.0 - 88.5																16.0		
11973	97-204	89.5 - 91.0																15.7		
11970	97-204	92.0 - 93.5																15.8		
11970	97-204	94.5 - 96.0																15.8		
11976	97-204	97.0 - 98.5																16.1		
11971	97-205	4.5 -6.0																13.7		
11970	97-205	9.5 - 11.0																13.5		
11979	97-205	14.5 - 16.0	CL	78.0		22.0	0.0			40	27							13.9		
11980	97-205	19.5 - 21.0																8.7		
11981	97-205	21.0 CONTACT																10.0		
11982	97-205	22.0 - 23.5																11.9		
11983	97-205	24.5 - 26.0																12.3		
11984	97-205	27.0 - 28.5																13.4		
11985	97-205	29.5 - 31.0																13.1		
11986	97-205	32.0 - 33.5																12.9		
11987	97-205	34.5 - 36.0																14.8		
11988	97-205	37.0 - 38.5																14.7		
11989	97-205	39.5 - 41.0																14.6		
11990	97-205	42.0 - 43.5																14.6		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

7-1733 (8-71)
Bureau of Reclamation

SUMMARY OF PHYSICAL PROPERTIES TEST RESULTS (Inplace Density)

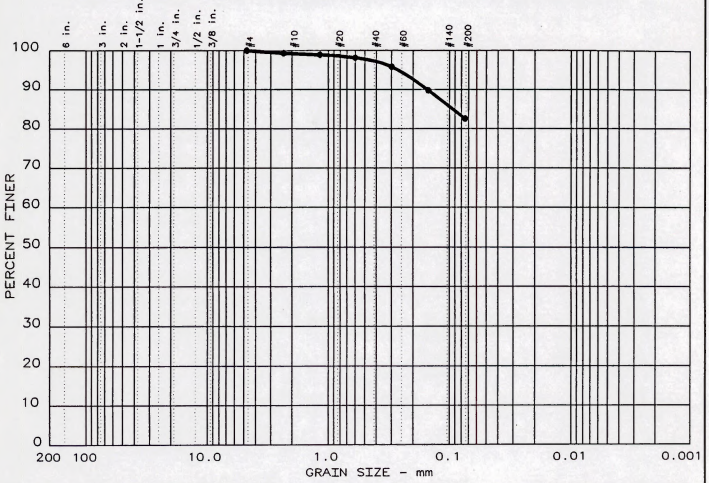
Table: 7
Sheet 7 of 7

Project: BLM Feature: ANITA DAM

IDENTIFICATION			USCS	PARTICLE-SIZE FRACTIONS						CONSISTENCY LIMITS			SPECIFIC GRAVITY				INPLACE DENSITY			
SAMPLE NUMBER	HOLE NUMBER	DEPTH - Feet (m)	CLASSIFICATION SYMBOL	SMALLER THAN 0.005 mm	0.005 TO 0.074 mm	SAND NO. 200/0.074 mm TO NO. 4(4.76 mm)	GRAVEL NO. 4(4.76 mm) TO 3 IN.(76.2 mm)	COBBLES 3 IN.(76.2 mm) TO 5 IN.(127 mm)	OVERSIZE LARGER THAN 6 IN.(127 mm)	LIQUID LIMIT - %	PLASTICITY INDEX - %	SHRINKAGE LIMIT - %	MINUS NO. 4	BULK - PLUS NO. 4	APPARENT - PLUS NO. 4	ABSORPTION-PLUS NO. 4 %	DRY DENSITY - pcf (gm/cm3)	WATER CONTENT - %	DEGREE OF SATURATION %	
11991	97-205	44.5 - 46.5																13.8		
11992	97-205	47.0 - 48.5	CL	75.8		24.2	0.0			42	29							15.1		
11993	97-205	49.5 - 51.0																15.3		
11994	97-205	53.0 - 54.5																13.8		

NOTE: Numbers in parentheses are metric equivalents of numbers directly above.

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	1	0.0	0.0	17.4	82.6		CL	45	33

SIEVE inches size	PERCENT FINER ●		
	GRAIN SIZE		
D_{60} D_{30} D_{10}			
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	99.3		
16	98.9		
30	98.1		
50	95.8		
100	89.8		
200	82.6		

Sample information:
● 97-201 @ 15.0'- 16.5'
(SPT sample)
Lean clay with sand

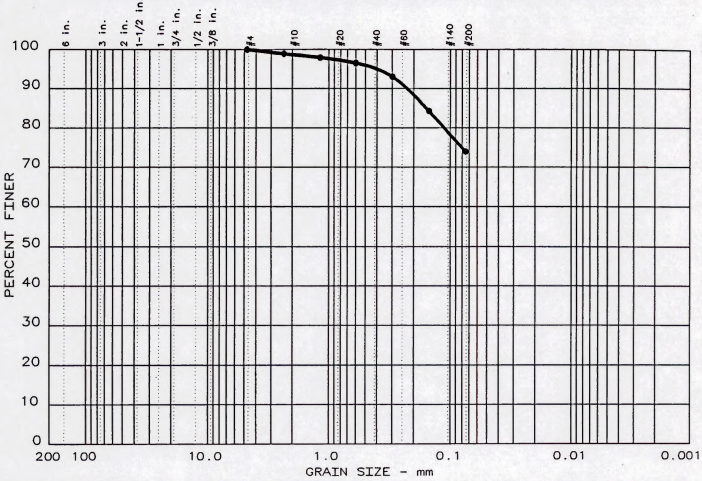
Remarks:
Lab #11863.
Sampled by client.
Natural Moist.= 15.4%.
Call #7.

MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)
Date: 06-20-97

Fig. No.: 1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	2	0.0	0.0	26.0	74.0		CL	39	27

SIEVE inches size	PERCENT FINER ●		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	98.9		
16	97.9		
30	96.5		
50	93.0		
100	84.3		
200	74.0		

Sample information:
● 97-201 @ 50.5'- 52.0'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11871.
Sampled by client.
Natural Moist.= 18.4%.
Call #7.

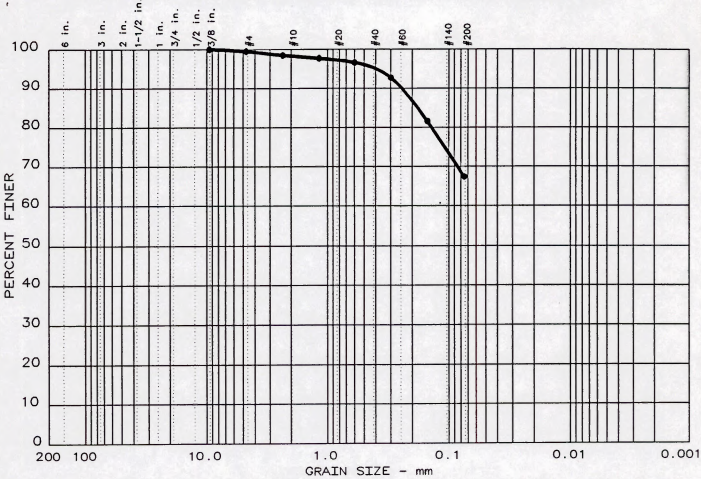
MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 2

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	3	0.0	0.5	32.1	67.4		CL	41	29

SIEVE inches size	PERCENT FINER ●		
0.375	100.0		
	GRAIN SIZE		
D_{60}			
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	99.5		
8	98.5		
16	97.7		
30	96.6		
50	92.7		
100	81.6		
200	67.4		

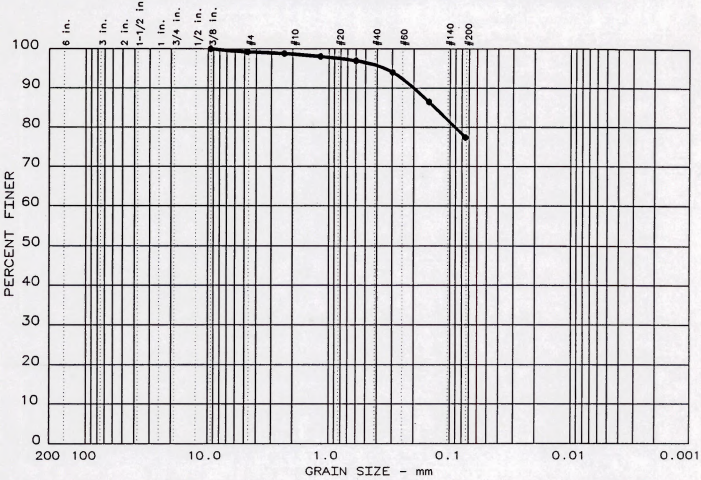
Sample information:
● 97-202 @ 32.0'- 33.5'
(SPT sample)
Sandy lean clay

Remarks:
Lab #11896.
Sampled by client.
Natural Moist.= 15.1%.
Call #7.

MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)
Date: 06-20-97
Fig. No.: 3

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	4	0.0	0.8	21.8	77.4		CL	39	28

SIEVE inches size	PERCENT FINER ●		
0.375	100.0		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	99.2		
8	98.8		
16	98.0		
30	96.9		
50	94.0		
100	86.5		
200	77.4		

Sample information:
● 97-202 @ 42.0'- 43.5'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11900.
Sampled by client.
Natural Moist.= 16.4%.
Call #7.

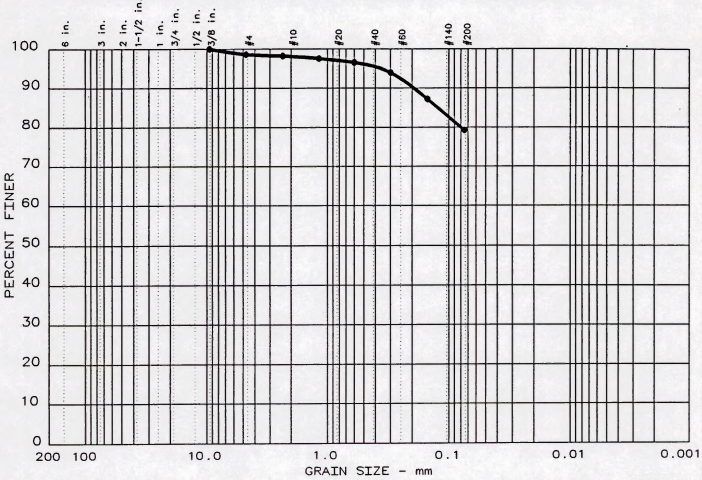
MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 4

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	6	0.0	1.4	19.3	79.3		CL	45	31

SIEVE inches size	PERCENT FINER ●		
0.375	100.0		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	98.6		
8	98.2		
16	97.5		
30	96.5		
50	93.9		
100	87.2		
200	79.3		

Sample information:
● 97-203 @ 24.5'- 26.0'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11917.
Sampled by client.
Natural Moist.= 15.3%.
Call #7.

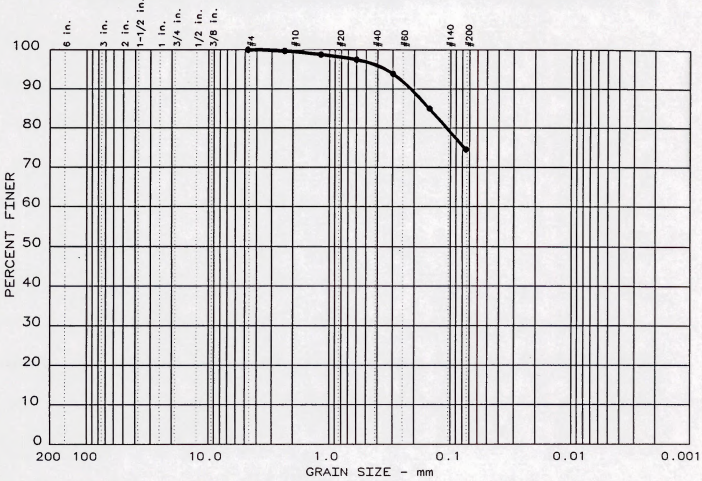
MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 5

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	7	0.0	0.0	25.4	74.6		CL	43	31

SIEVE inches size	PERCENT FINER ●		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	99.7		
16	98.8		
30	97.5		
50	93.9		
100	85.0		
200	74.6		

Sample information:
● 97-203 @ 67.0'- 68.5'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11932.
Sampled by client.
Natural Moist.= 17.8%.
Call #7.

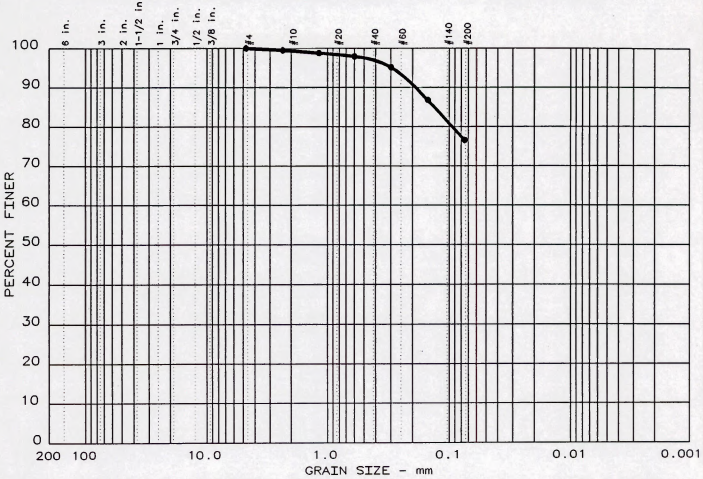
MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 6

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	8	0.0	0.0	23.4	76.6		CL	40	28

SIEVE inches size	PERCENT FINER ●		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	99.5		
16	98.8		
30	97.9		
50	95.1		
100	86.8		
200	76.6		

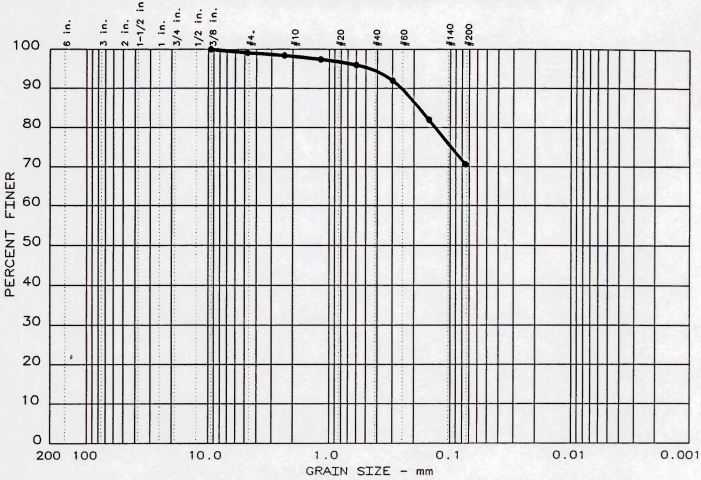
Sample information:
● 97-204 @ 39.5'- 41.0'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11952.
Sampled by client.
Natural Moist.= 10.4%.
Call #7.

MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)
Date: 06-20-97
Fig. No.: 7

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	9	0.0	0.9	28.4	70.7		CL	37	26

SIEVE inches size	PERCENT FINER ●		
0.375	100.0		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	99.1		
8	98.4		
16	97.4		
30	96.0		
50	92.0		
100	82.0		
200	70.7		

Sample information:

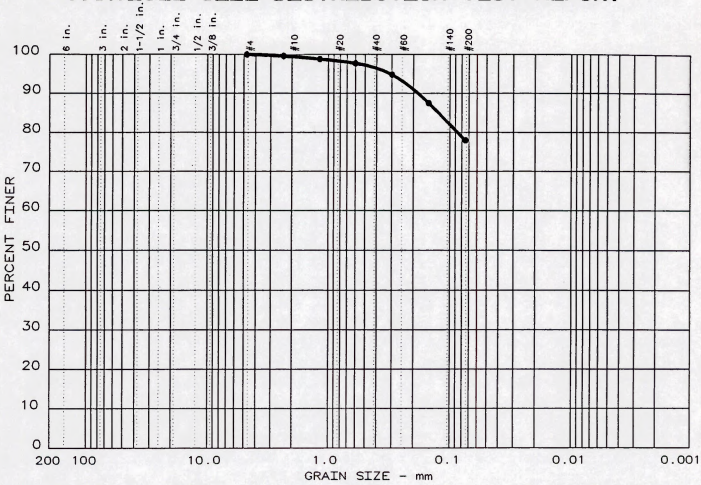
● 97-204 @ 69.5'- 71.0'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11965.
Sampled by client.
Natural Moist.= 16.2%.
Call #7.

MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)
Date: 06-20-97
Fig. No.: 8

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	10	0.0	0.0	22.0	78.0		CL	40	27

SIEVE inches size	PERCENT FINER ●		
	GRAIN SIZE		
D_{60} D_{30} D_{10}			
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	99.6		
16	98.8		
30	97.7		
50	94.8		
100	87.5		
200	78.0		

Sample information:
● 97-205 @ 14.5'- 16.0'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11979.
Sampled by client.
Natural Moist.= 13.9%.
Call #7.

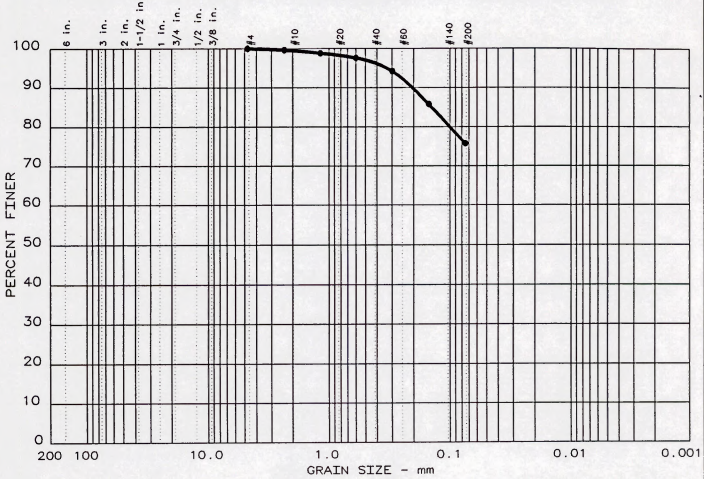
MSE-HKM, INC.

Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 9

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	11	0.0	0.0	24.2	75.8		CL	42	29

SIEVE inches size	PERCENT FINER ●		
GRAIN SIZE			
D_{60}			
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ●		
4	100.0		
8	99.6		
16	98.8		
30	97.6		
50	94.2		
100	85.8		
200	75.8		

Sample information:
● 97-205 @ 47.0'- 48.5'
(SPT sample)
Lean clay with sand

Remarks:
Lab #11992.
Sampled by client.
Natural Moist.= 15.1%.
Call #7.

MSE-HKM, INC.

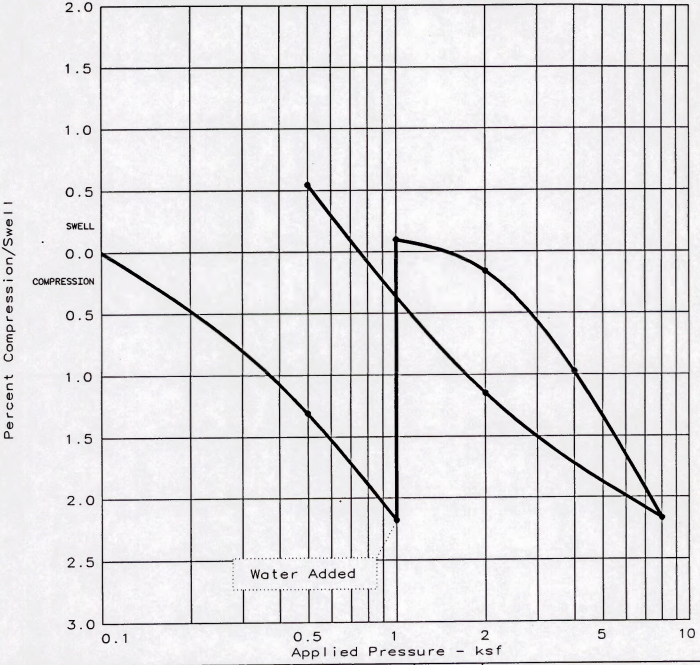
Project No.: 11M145.115
Project: U.S.B.R.- Anitia Dam (BLM)

Date: 06-20-97

Fig. No.: 10

ONE-DIMENSIONAL CONSOLIDATION TESTS
PR97-201

CONSOLIDATION TEST REPORT



Natural Saturation	Natural Moisture	Dry Dens. (pcf)	LL	PI	Sp.Gr.	Initial void ratio
93.5 %	18.4 %	109.2	N/T	N/T	2.650	0.5207

TEST RESULTS

Percent swell = 2.3

Project No.: 11M145.115
Project: U.S.B.R.- Anita Dam
Location: DH 97-201 @ 32.4'- 33.5'

Date: 05-29-97

CONSOLIDATION TEST REPORT

MSE-HKM, INC.

MATERIAL DESCRIPTION

Existing embankment

Class: N/T

Remarks:

Lab #11847.
Sampled by client.
Sp.Gr. is assumed.
Swell pressure not determined (> 8ksf).

Fig. No. 1

CONSOLIDATION TEST PROJECT DATA

Test No. 19

Project Number:	11M145.115
Project:	U.S.B.R.- Anita Dam
Date:	05-29-97
Location 1:	DH 97-201 @ 32.4'- 33.5'
2:	
Remarks 1:	Lab #11847.
2:	Sampled by client.
3:	Sp.Gr. is assumed.
4:	Swell pressure not
5:	determined (> 8ksf).
Material description	Existing embankment
Classification:	N/T
Liquid limit:	N/T
Plasticity index:	N/T
Figure Number:	1

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 242.30 g.	Oedometer No. = 1	Wet w+t = 537.00 g.
Dry w+t = 204.70 g	Machine No. = 1	Dry w+t = 519.50 g.
Tare wt. = 0.00 g.	Spec. Gravity = 2.650	Tare wt. = 435.00 g.
Height = 1.0000 in.	Height = 1.0000 in.	
Diameter = 1.9410 in.	Diameter = 1.9410 in.	
Weight = 100.41 g.		
Moisture = 18.4 %	Ht. Solids = 0.6576 in.	Moisture = 20.7 %
Wet Den. = 129.3 pcf	Dry wt. = 84.83 g.	Dry wt. = 84.50 g. *
Dry Den. = 109.2 pcf	Void ratio = 0.5207	Void ratio = 0.5289
	Saturation = 93.5 %	

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.20000			0.5207	
0.50	0.21380	0.0007	0.21310	0.5007	1.3 Comprs.
1.00	0.22290	0.0011	0.22180	0.4875	2.2 Comprs.
1.00	0.20010	0.0011	0.19900	0.5222	0.1 Swell
2.00	0.20310	0.0015	0.20160	0.5182	0.2 Comprs.
4.00	0.21175	0.0020	0.20975	0.5058	1.0 Comprs.
8.00	0.22420	0.0025	0.22170	0.4877	2.2 Comprs.
2.00	0.21300	0.0015	0.21150	0.5032	1.2 Comprs.
0.50	0.19525	0.0007	0.19455	0.5289	0.5 Swell

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED

Load 0.50 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0007

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.20000	11	1440.00	0.21380
2	0.25	0.20120			
3	0.50	0.20130			
4	1.00	0.20140			
5	2.00	0.20150			
6	4.00	0.20150			
7	8.00	0.20180			
8	15.00	0.20200			
9	30.00	0.20230			
10	60.00	0.20290			

Void Ratio: 0.5007 Compression: 1.3 %

Load 1.00 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0011

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21380	11	1440.00	0.22290
2	0.25	0.21450			
3	0.50	0.21450			
4	1.00	0.21460			
5	2.00	0.21460			
6	4.00	0.21470			
7	8.00	0.21480			
8	15.00	0.21480			
9	30.00	0.21500			
10	60.00	0.21550			

Void Ratio: 0.4875 Compression: 2.2 %

Load 1.00 ksf CONSOLIDATION TEST READINGS Load No. 3

Machine Deflection 0.0011

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.22290	11	1440.00	0.20010
2	0.25	0.22280			
3	0.50	0.22280			
4	1.00	0.22270			
5	2.00	0.22260			
6	4.00	0.22240			
7	8.00	0.22200			
8	15.00	0.22150			
9	30.00	0.22050			
10	60.00	0.21800			

Void Ratio: 0.5222 Swell: 0.1 %

Load 2.00 ksf CONSOLIDATION TEST READINGS Load No. 4

Machine Deflection 0.0015

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.20010	11	60.00	0.20305
2	0.10	0.20100	12	120.00	0.20325
3	0.25	0.20130	13	180.00	0.20330
4	0.50	0.20140	14	240.00	0.20330
5	1.00	0.20170	15	300.00	0.20335
6	2.00	0.20180	16	360.00	0.20335
7	4.00	0.20210	17	1200.00	0.20315
8	8.00	0.20230	18	1260.00	0.20315
9	15.00	0.20250	19	1320.00	0.20310
10	30.00	0.20280			

Void Ratio: 0.5182 Compression: 0.2 %
D0 = 0.1993 D90 = 0.2007 D100 = 0.2008 T90 = 5.14 min.
Cv @ 5.1 min.= 0.041 sq. in./min.

Load 4.00 ksf CONSOLIDATION TEST READINGS Load No. 5

Machine Deflection 0.0020

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.20310	11	60.00	0.20890
2	0.10	0.20430	12	120.00	0.20960
3	0.25	0.20510	13	180.00	0.21010
4	0.50	0.20530	14	240.00	0.21040
5	1.00	0.20570	15	300.00	0.21065
6	2.00	0.20610	16	420.00	0.21095
7	4.00	0.20650	17	1380.00	0.21175
8	8.00	0.20705	18	1440.00	0.21175
9	15.00	0.20760			
10	30.00	0.20820			

Void Ratio: 0.5058 Compression: 1.0 %
D0 = 0.2018 D90 = 0.2046 D100 = 0.2049 T90 = 4.50 min.
Cv @ 4.5 min.= 0.047 sq. in./min.

Load 8.00 ksf CONSOLIDATION TEST READINGS Load No. 6

Machine Deflection 0.0025

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21175	11	60.00	0.21990
2	0.10	0.21410	12	120.00	0.22090
3	0.25	0.21460	13	180.00	0.22155
4	0.50	0.21490	14	240.00	0.22200
5	1.00	0.21530	15	300.00	0.22235
6	2.00	0.21590	16	360.00	0.22260
7	4.00	0.21675	17	420.00	0.22285
8	9.00	0.21740	18	488.00	0.22315
9	15.00	0.21800	19	1380.00	0.22410
10	30.00	0.21890	20	1440.00	0.22420

Void Ratio: 0.4877 Compression: 2.2 %
D0 = 0.2111 D90 = 0.2146 D100 = 0.2149 T90 = 6.14 min.
Cv @ 6.1 min.= 0.033 sq. in./min.

Load 2.00 ksf CONSOLIDATION TEST READINGS Load No. 7

Machine Deflection 0.0015

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.22420	11	120.00	0.21725
2	0.25	0.22190	12	240.00	0.21610
3	0.50	0.22145	13	300.00	0.21570
4	1.00	0.22090	14	360.00	0.21525
5	2.00	0.22065	15	420.00	0.21500
6	4.00	0.22030	16	1440.00	0.21300
7	8.00	0.21985			
8	15.00	0.21950			
9	30.00	0.21895			
10	60.00	0.21830			

Void Ratio: 0.5032 Compression: 1.2 %

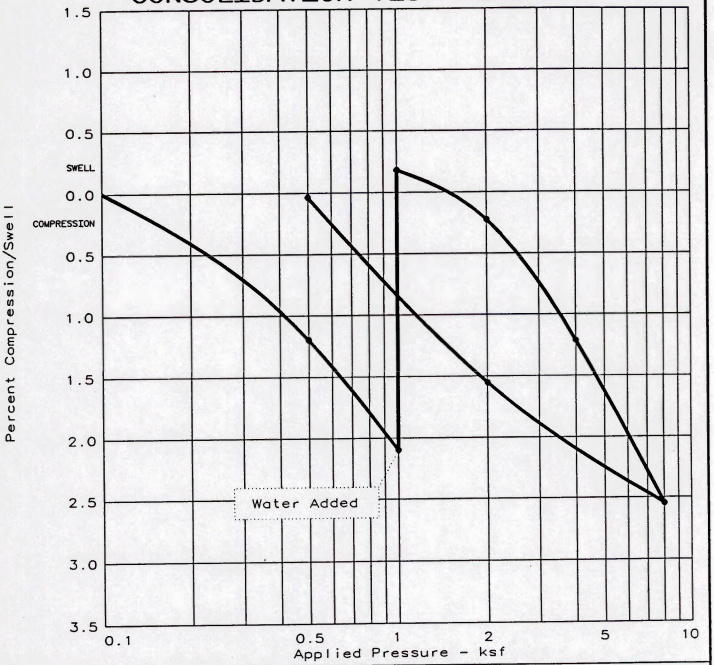
Load 0.50 ksf CONSOLIDATION TEST READINGS Load No. 8

Machine Deflection 0.0007

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21300	11	1982.00	0.19525
2	0.25	0.21190			
3	0.50	0.21170			
4	1.00	0.21150			
5	2.00	0.21125			
6	4.00	0.21095			
7	8.00	0.21050			
8	15.00	0.21010			
9	30.00	0.20940			
10	60.00	0.20840			

Void Ratio: 0.5289 Swell: 0.5 %

CONSOLIDATION TEST REPORT



Swell press.	Nat. Sat.	Nat. Moist.	Dry Dens. (pcf)	LL	PI	Sp.Gr.	Initial void ratio
5.39	97.2 %	20.9 %	105.8	N/T	N/T	2.650	0.5689

TEST RESULTS

Percent swell = 2.3

MATERIAL DESCRIPTION

Existing embankment

Class: N/T

Project No.: 11M145.115
Project: U.S.B.R.- Anita Dam
Location: DH 97-201 @ 37.0'- 38.8'

Date: 05-29-97

Remarks:

Lab #11848.
Sampled by client.
Sp.Gr. is assumed.

CONSOLIDATION TEST REPORT

MSE-HKM, INC.

Fig. No. 2

CONSOLIDATION TEST PROJECT DATA

Test No. 20

Project Number: 11M145.115
Project: U.S.B.R.- Anita Dam
Date: 05-29-97
Location 1: DH 97-201 @ 37.0'- 38.8'
2:
Remarks 1: Lab #11848.
2: Sampled by client.
3: Sp.Gr. is assumed.
4:
5:
Material description Existing embankment

Classification: N/T
Liquid limit: N/T
Plasticity index: N/T
Figure Number: 2

CONSOLIDATION TEST SPECIMEN DATA

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 227.10 g.	Oedometer No. = 2	Wet w+t = 535.10 g.
Dry w+t = 187.90 g	Machine No. = 2	Dry w+t = 517.30 g.
Tare wt. = 0.00 g.	Spec. Gravity = 2.650	Tare wt. = 435.40 g.
Height = 1.0010 in.	Height = 1.0010 in.	
Diameter = 1.9400 in.	Diameter = 1.9400 in.	
Weight = 99.31 g.		
Moisture = 20.9 %	Ht. Solids = 0.6380 in.	Moisture = 21.7 %
Wet Den. = 127.9 pcf	Dry wt. = 82.17 g.	Dry wt. = 81.90 g. *
Dry Den. = 105.8 pcf	Void ratio = 0.5689	Void ratio = 0.5683
	Saturation = 97.2 %	

* Final dry weight used in calculations

CONSOLIDATION TEST READINGS SUMMARY

LOAD (ksf)	DIAL (in.)	DEFLECTION (in.)	CORRECTED DIAL (in.)	VOID RATIO	% SWELL/COMPRS.
Initial	0.20000			0.5689	
0.50	0.21250	0.0005	0.21200	0.5501	1.2 Comprs.
1.00	0.22150	0.0005	0.22100	0.5360	2.1 Comprs.
1.00	0.19870	0.0005	0.19820	0.5717	0.2 Swell
2.00	0.20305	0.0008	0.20225	0.5654	0.2 Comprs.
4.00	0.21305	0.0009	0.21215	0.5498	1.2 Comprs.
8.00	0.22700	0.0015	0.22550	0.5289	2.5 Comprs.
2.00	0.21635	0.0008	0.21555	0.5445	1.6 Comprs.
0.50	0.20085	0.0005	0.20035	0.5683	0.0 Comprs.

CONSOLIDATION TEST RESULTS

Compression index = NOT SELECTED
Preconsolidation pressure = NOT SELECTED
Swell pressure = 5.39 @ 1.000 ksf applied
Swell percentage = 2.3 @ 1.000 ksf applied

Load 0.50 ksf — CONSOLIDATION TEST READINGS — Load No. 1

Machine Deflection 0.0005

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.20000	11	1440.00	0.21250
2	0.25	0.20190			
3	0.50	0.20200			
4	1.00	0.20200			
5	2.00	0.20210			
6	4.00	0.20220			
7	8.00	0.20230			
8	15.00	0.20230			
9	30.00	0.20240			
10	60.00	0.20290			

Void Ratio: 0.5501 Compression: 1.2 %

Load 1.00 ksf — CONSOLIDATION TEST READINGS — Load No. 2

Machine Deflection 0.0005

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21250	11	1440.00	0.22150
2	0.25	0.21280			
3	0.50	0.21290			
4	1.00	0.21290			
5	2.00	0.21290			
6	4.00	0.21300			
7	8.00	0.21310			
8	15.00	0.21320			
9	30.00	0.21340			
10	60.00	0.21380			

Void Ratio: 0.5360 Compression: 2.1 %

Load 1.00 ksf CONSOLIDATION TEST READINGS Load No. 3

Machine Deflection 0.0005

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.22150	11	1440.00	0.19870
2	0.25	0.22090			
3	0.50	0.22090			
4	1.00	0.22060			
5	2.00	0.22040			
6	4.00	0.21990			
7	8.00	0.21870			
8	15.00	0.21760			
9	30.00	0.21580			
10	60.00	0.21200			

Void Ratio: 0.5717 Swell: 0.2 %

Load 2.00 ksf CONSOLIDATION TEST READINGS Load No. 4

Machine Deflection 0.0008

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.19870	11	60.00	0.20180
2	0.10	0.19940	12	120.00	0.20220
3	0.25	0.19960	13	180.00	0.20240
4	0.50	0.19970	14	240.00	0.20250
5	1.00	0.19990	15	300.00	0.20260
6	2.00	0.20000	16	360.00	0.20265
7	4.00	0.20030	17	1200.00	0.20305
8	8.00	0.20060	18	1264.00	0.20305
9	15.00	0.20100	19	1320.00	0.20305
10	30.00	0.20140			

Void Ratio: 0.5654 Compression: 0.2 %
D0 = 0.1984 D90 = 0.2000 D100 = 0.2001 T90 = 10.58 min.
Cv @ 10.6 min.= 0.020 sq. in./min.

Load 4.00 ksf CONSOLIDATION TEST READINGS Load No. 5

Machine Deflection 0.0009

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.20305	11	60.00	0.20995
2	0.10	0.20430	12	120.00	0.21100
3	0.25	0.20470	13	180.00	0.21150
4	0.50	0.20490	14	240.00	0.21180
5	1.00	0.20530	15	300.00	0.21205
6	2.00	0.20580	16	420.00	0.21235
7	4.00	0.20640	17	1380.00	0.21285
8	8.00	0.20710	18	1440.00	0.21305
9	15.00	0.20790			
10	30.00	0.20895			

Void Ratio: 0.5498 Compression: 1.2 %
D0 = 0.2030 D90 = 0.2062 D100 = 0.2065 T90 = 7.72 min.
Cv @ 7.7 min.= 0.027 sq. in./min.

Load 8.00 ksf CONSOLIDATION TEST READINGS Load No. 6

Machine Deflection 0.0015

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21305	11	60.00	0.22275
2	0.10	0.21520	12	120.00	0.22415
3	0.25	0.21580	13	180.00	0.22490
4	0.50	0.21600	14	240.00	0.22535
5	1.00	0.21670	15	300.00	0.22565
6	2.00	0.21735	16	360.00	0.22585
7	4.00	0.21810	17	420.00	0.22600
8	8.00	0.21900	18	480.00	0.22615
9	15.00	0.22000	19	1380.00	0.22685
10	30.00	0.22125	20	1440.00	0.22700

Void Ratio: 0.5289 Compression: 2.5 %
D0 = 0.2131 D90 = 0.2171 D100 = 0.2176 T90 = 6.24 min.
Cv @ 6.2 min.= 0.033 sq. in./min.

Load 2.00 ksf CONSOLIDATION TEST READINGS Load No. 7

Machine Deflection 0.0008

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.22700	11	120.00	0.21910
2	0.25	0.22500	12	240.00	0.21785
3	0.50	0.22530	13	300.00	0.21750
4	1.00	0.22490	14	360.00	0.21720
5	2.00	0.22465	15	420.00	0.21710
6	4.00	0.22420	16	1440.00	0.21635
7	8.00	0.22350			
8	15.00	0.22280			
9	30.00	0.22180			
10	60.00	0.22045			

Void Ratio: 0.5445 Compression: 1.6 %

Load 0.50 ksf CONSOLIDATION TEST READINGS Load No. 8

Machine Deflection 0.0005

No.	Elapsed Time	Dial Reading	No.	Elapsed Time	Dial Reading
1	0.00	0.21635	11	1980.00	0.20085
2	0.25	0.21540			
3	0.50	0.21510			
4	1.00	0.21490			
5	2.00	0.21465			
6	4.00	0.21415			
7	8.00	0.21355			
8	15.00	0.21280			
9	30.00	0.21175			
10	60.00	0.21015			

Void Ratio: 0.5683 Compression: 0.0 %

DISPERSIVE CLAY TESTS
PR97-202

ANITA DAM
TEST DATA SUMMARY

PR97-202

TEST DATA

Sample Identification	Remolded Dry Density(pcf)	Moisture Content (%)*	Hydraulic Head(inches)	Final Cloudiness	Final Diameter of Pinhole(mm)	Dispersive Classification	Crumb Test Classification
No. 1 19.5'-24.5'	113.2	14.4	15	Slight to Medium	2.5	Slightly Dispersive-SD	Definite Dispersion Problem

* As Received Moisture Content

Client Name: USDI BUREAU OF LAND MANAGEMENT - MILES CITY
Project No.: 93-925-1
Laboratory No.: 184008
Sample Name: PINHOLE 19.5-24.5'
Sample Date: 05/12/97
Collected by: NONE GIVEN
Time Sampled: NONE GIVEN
Sample Type: SOIL

PARAMETER	MEASURED VALUE		METHOD NUMBER	DATE ANALYZED
SOIL				
Calcium saturated paste	22.4	meq/l	S 1.60	06/20/97
Electrical Conductivity Saturated Paste	7.53	mmhos/cm	S 1.20	06/19/97
Magnesium saturated paste	18.5	meq/l	S 1.60	06/20/97
Sodium Absorption Ratio	13.2		S 1.60	06/20/97
Sodium saturated paste	59.5	meq/l	S 1.60	06/20/97
Total Dissolved Salts	4820	mg/l	S 1.20	06/19/97